

COMPOSITIONAL FLUENCY AND SPELLING ACCURACY
OF SECOND-GRADE STUDENTS UNDER SIX PRIMING CONDITIONS

By

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This study addressed three questions related to the effects of six priming conditions on the writing of 195 second graders in four schools of a northeastern Florida school district. The first concerned the role of the priming conditions on the compositional fluency and spelling accuracy of second graders. Would there be differential effects due to conditions among the whole group and smaller subgroups? The second question asked whether the effects seen among the students would be different in groupings based on ability, gender, and socio-economic status. The third asked what variables explain the variance in the observed compositional fluency and spelling accuracy. The students were asked to write six narratives in response to story starters presented in six different ways designed to provide differential priming. The conditions were (a) copying, (b) dictation, (c) discussion, (d) discussion and copying, (e) discussion and dictation, and (f) topic. In addition, data were collected on the (a) sentence-copying

fluency, (b) letter-generating fluency, (c) reading comprehension, and (d) spelling achievement. The findings for the entire sample—subgroups defined by reading achievement, handwriting fluency, and spelling achievement—are presented. In addition, results based on group comparisons based on presence of a disability, gender, Title 1 enrollment, socioeconomic status, and giftedness are presented. Theoretical implications are discussed, as are implications for the field and future research directions.

CHAPTER 1 INTRODUCTION TO THE PROBLEM

The ability to write one's thoughts fluently and proficiently is an important skill in our increasingly technical and literate society. To write quickly and accurately a narrative or expository text is a sign of writing proficiency, and writing is the primary way students are asked to display their knowledge in school (Graham, 1992). It is thought that writing about a topic helps people to understand it better; writing is a common means of personal communication and can be a source of personal entertainment or enjoyment (Graham, 1992). Because writing is valued as a critical academic tool, it is an important component of the standardized assessments (e.g., Florida Writing Assessment Program and National Assessment of Educational Progress [NAEP]) administered to schoolchildren in the United States.

These same assessments show that students in the fourth, eighth, and eleventh grades have not improved much in their ability to write connected text to a prompt in the last decade. In an analysis of trends in writing fluency and writing conventions from 1984 to 1996 on NAEP assessments, Ballator, Farnum, and Kaplan (1999) found that the students in Grades 4 and 11 did not significantly improve on holistic quality scales while the students in eighth grade did. On measures associated with improvements in writing skills (i.e., average number of words written, average number of sentences per story, and average number of words per sentence), there was a significant increase in Grades 8 and 11 only. Even though the stories written by students in the eighth and eleventh grades

were longer in 1996, the average number of errors per 100 words did not change from 1984 to 1996. Fourth graders were unchanged in terms of total words written, number of sentences, the number of words per sentence, average errors per 100 words, and the percentage of spelling errors. The writing instruction between 1984 and 1996 has not resulted in improved writing proficiency outcomes for school-aged children.

In addition to these special writing assessments, the NAEP also conducts regular writing assessments. Students are asked to write to two randomly selected prompts (see Appendix A for an example from the 1998 NAEP). The writing samples then are scored using a rubric and are characterized as basic, proficient, and advanced. Basic writing samples are somewhat organized and provide some details. They often lack punctuation and have some grammatical lapses that force the reader to fill in gaps to understand them fully. Proficient writing samples are clear and organized with some illustrative details. They show good plot development, and most of the responses are punctuated and capitalized correctly with few grammatical errors. Advanced samples have strong audience awareness and are well structured with a strong ending, varied sentence structures, and effective vocabulary (National Center for Educational Statistics, 1999). In general, the NAEP characterizes the basic level as showing partial mastery of the necessary knowledge and skills fundamental for success at each grade (NAEP, 1999). Students who score at the proficient level show solid academic performance and demonstrate competency over challenging subject matter, whereas advanced students demonstrate superior performance (NAEP, 1999).

This scoring information is important when one considers the following results for the fourth grade from the most recent NAEP in 1998. Of all the students who were

assessed, 60% scored at or below the basic level with 16% falling below. Sixty percent of the students were able to show partial mastery or less in writing-connected text. When one considers different ethnic groups, the picture becomes even more dismal. Fifty-nine percent of White students, 61% of Black, 62% of Hispanic, and 64% of Native Americans scored at or below the basic level. This does not seem too disparate until one considers the number of students who fall below the basic level—who show less than partial mastery of writing composition. Ten percent of White students, 31% of Black, 28% of Hispanic, and 24% of American Indian students were below even the basic level of proficiency. Culturally diverse students are failing in this measure of writing competence in overwhelming numbers and well over half of the students who provided writing samples were unable to show mastery of writing. It is not unreasonable to draw the conclusion that writing instruction in the United States needs improvement.

Because writing is so important and the writing skills of many children in the United States are lacking basic levels of proficiency, one may expect a great deal of research in the processes behind writing and in writing instruction. This is not the case. Though research in writing and its component skills has increased in recent years (Knudson, 1992), it is an area that needs additional investigation. One recommended method of increasing writing proficiency in children is frequent opportunities to compose text. Graham (1992) recommended that students spend approximately 45 minutes to 1 hour 4 days a week writing in order to develop as writers. Finding ways to promote an increase in time spent writing is a challenge for teachers who often turn to story starters to encourage children to write connected text.

Story starters are used widely in classroom instruction, in informal assessment, and in high-stakes standardized assessments to elicit writing products from children. Examples from the 1999 Florida Comprehensive Writing Assessment can be found in Appendix B.

A look at the gray literature shows the widespread use of story starters. In a request to the AskERIC Department of Education database, 104 lesson plans for how to use story starters were received. AskERIC is a personalized Internet-based service providing education information that began in 1992 as a project of the ERIC Clearinghouse on Information and Technology. Examples of story starters examined included (a) providing a picture, (b) providing the end of the story; (c) reading a book to copy the plot, and (d) creating a project and writing about it. The most common form of story starters, however, is a beginning sentence or sentences printed on a lined piece of paper that is given to the students to read and finish the story. There is little research on the effects of story starters and none on their presentation. The research on story starters identified for this study has focused on the stereotypic content of story starters (Trepanier-Street, Romatowski, & McNair, 1990), starters that promote story planning (Graves, Montague, & Wong, 1990), comparing types of pictures as prompts (Knudson, 1992), and story starters that provide the beginning of the story as compared to prompts that provide the ending (Isaacson & Mattoon, 1990). What has not been researched is what approach should be used to present the story starters in order to best promote fluent writing in young children.

Rationale for the Study

Connectionist theory provides a theoretical framework for explaining the processes involved in language-based cognition such as reading, language acquisition, and spelling (e.g., Seidenberg & McClelland, 1989). Adams's (1990) parallel-distributed processing model of reading has much promise for explaining the cognitive processes inherent in decoding sound and meaning from print (i.e., reading). Adams suggested that the same model can also account for how sound and meaning are encoded to print (i.e., writing). Empirical evidence of the interconnected nature of reading and spelling lends support to her contention (Ehri, 1991, 1995, 1997; Foorman, Francis, Novy, & Liberman, 1991; Moats, 1995; Nation & Hulme, 1996). An additional source of support for the Adams model is provided by the literature in priming effects on language processing.

There is considerable evidence that providing different types of priming information (i.e., semantic, morphological, orthographic, and phonological) before the processing of words leads to facilitated processing speed in such tasks as (a) lexical decision (Nation & Snowling, 1999), (b) fragment completion (Rueckl, Mikolinski, Raveh, Miner, & Mars, 1997), (c) speeded word recognition (MacLeod, 1996; MacLeod & Masson, 2000), (d) word naming (Booth, Perfetti, MacWhinney, 1999), (e) writing target words (Booth et al., 1999), (f) alphabetic decision making and letter naming (Ziegler, Ferrand, Jacobs, Rey, & Grainger, 2000), (g) pseudohomophone naming (Laxon, Smith, & Masterson, 1995), and (h) nonword spelling accuracy (Campbell, 1983, 1985; Nation & Hulme, 1996). The effect in literacy activities is robust, especially for repetition, morphological, and phonological priming. However, the effects of different types of priming information on writing connected text in natural settings have not been

established. To date, there has been no research to investigate the effects priming conditions have on the production of connected text. The priming paradigm holds much promise for providing a window into the processes inherent in spelling accurately and writing fluently.

What also remains unclear is the effect story starters have on the writing of children. Perhaps they provide a facilitative priming effect, but perhaps they do not. Research on the effects that story starters presented in various conditions (orthographic, phonological, and contextual) have on writing fluency and spelling accuracy has promise to determine whether facilitative effects seen in reading-related tasks can be seen in writing.

The purpose of this study was to determine the effects of different presentations of story starters designed to provide differential priming effects on the writing of children still developing in their spelling and reading ability. Second graders were chosen because they have acquired much reading and writing knowledge, but their processing is still transparent enough for examination. In addition, support for a unitary parallel-distributed processing model for both reading and spelling was sought through extension of priming effects found in reading-related tasks to a writing task. The primary research question guiding this study was as follows: "What are the effects of various priming conditions on the writing fluency and spelling accuracy of second-grade students?"

Scope of the Study

This study was conducted within a limited scope. The delimitations and limitations are described in the following sections.

Delimitations

This study was delimited by geographical location to one school district in north central Florida. It is a medium-sized district in a city that houses the University of Florida. The participants were 196 second-grade students in four schools. The schools selected represent the makeup of the general population in socioeconomic status, gender, and ethnicity (see Chapter 3, Table 3). All second-grade students in the cooperating schools were selected to participate in this study. They were asked to write narrative stories within six story starter conditions and were assessed on handwriting fluency, spelling achievement, and reading achievement. Classroom-groups of students were randomly assigned to which sequence of story starter conditions they received although all students wrote under all conditions. Subject consideration and assignment did not include consideration for gender, ethnicity, socioeconomic status, English-as-a-second language program, or special education status.

Limitations

This study was conducted with second-grade students. Therefore, the results of this study cannot be generalized to older or younger students. The story starters were designed to elicit goal-based narratives, and the results cannot be generalized to story starters designed to elicit expository writing. In addition, the results cannot be generalized to story starters who use a picture, provide a story ending, or use a book to elicit writing.

Definition of Key Terms

An understanding of applicable terminology is critical to the implementation and interpretation of this investigation. The following section defines relevant terms as they appear in this study.

Alphabetic principle refers to the systematic relationship between letters and sounds. Understanding of the alphabetic principle is necessary to read and write an alphabetic orthography.

Connectionism is a new biologically oriented perspective that attempts to show how rule-based behavior can be approximated through processes that do not involve rules or awareness (McClelland, Rumelhart, & Hinton, 1986). This is in direct contrast to the traditional model of human cognition of a computer with information stored in discrete locations that simply need to be accessed. In a connectionist system, knowledge is not located in one location but instead is in the relationships among many separate parts of the system.

Decoding is translating written symbols into oral language that makes sense (reading).

Encoding is translating oral language into written symbols (writing).

Fluency is performing a task in a flowing, quick, effortless, and accurate manner. In this study, writing fluency was measured by counting the number of words written in 3 minutes.

Morphological priming refers to the facilitative effect of presenting a prime that shares morphological aspects with the target word. For example, redo/repeat or sent/send.

Morphology is the system of meaning of a language. A morpheme is the smallest unit of meaning possible. For example, the word “prereading” has three morphemes: “pre,” which indicates before; “read,” which is a verb and indicates translating written text into oral language; and “ing,” which indicates that the action is in progress.

Orthographic priming is the facilitation of processing words after presentation of an orthographically similar prime such as weed/seed, wait/said, or aptitude/ATTITUDE (Hansen & Bowey, 1992). It is difficult to separate orthographic and phonological priming from each other because similar orthographic sequences often share similar sound sequences also.

Orthography is the system of written symbols used to represent speech. In an alphabetic language, these symbols are letters. Graphemes are single letters or groups of letters that represent one sound (phoneme).

Phonological priming refers to the possibility that the availability of a rhyming pronunciation via the prime may itself trigger correct reading of test words, even when an analogy based on orthography is inappropriate (e.g., head/said; Goswami, 1999).

Phonology is the system of sounds in a language. A phoneme is the smallest unit of sound and is represented by a grapheme in the written orthography of an alphabetic language. For example, “read” has three phonemes represented by four letters or three graphemes: r-ea-d.

Priming occurs when “the processing of a word (the target) is facilitated by a preceding stimulus (the prime)” (Forster, 1999, p. 5). In reading, priming is the identification of a target word as a function of a recent experience with the word itself or

with words related along a dimension of interest (Rueckl et al., 1997). In spelling it is the presence of target spelling patterns from the prime in the spelled target nonwords.

Pseudohomophones are nonwords with the pronunciation of real words but not the orthography. For example, TODE is a pseudohomophone of towed and toad.

Repetition priming is the presentation of a word as a prime and then again as a target word. The overlap of processing between the prime and target is complete, so it produces strong effects.

Semantic priming refers to the presentation of a prime that is semantically related to the target word (e.g., NURSE/DOCTOR).

Story starter refers to a phrase, a sentence, or more provided to a student to elicit writing. Story starters vary depending on the type of writing desired (persuasive, narrative, or expository).

Study Overview

This study is presented in several chapters. Chapter 2 provides a review of the related literature to explain (a) the theoretical framework, (b) explanatory model of reading and spelling, (c) review of research on the connection between reading and spelling, (d) review of research in priming effects, and (d) literature that contributed to the design of this study.

Chapter 3 includes the methods and materials that were used to conduct this study. The following topics are described: (a) research questions and hypotheses, (b) settings and participants, (c) priming conditions, (d) research instrumentation, (e) experimental design, and (f) treatment of the data.

Chapter 4 provides the results of the statistical analysis of the data from this study. Specifically, the following results are reported: (a) obtained reliability coefficients for measures used, (b) replicated Latin-square analysis of variance for compositional fluency and spelling accuracy, (b) replicated Latin-square analysis of variance for the compositional fluency and spelling accuracy of subgroups, (c) mixed repeated measures analysis of variance comparison of group responses for compositional fluency and spelling accuracy, (d) multiple regression analysis of word fluency, and (e) multiple regression analysis of spelling accuracy.

Chapter 5 includes an interpretation and discussion of the results, limitations, implications of the results for educational practice, and suggestions for future research.

CHAPTER 2 REVIEW OF RELATED LITERATURE

Chapter 2 provides a summary and analysis of the literature in reading and spelling from a connectionist theoretical framework. The framework section includes an account of (a) connectionist theory, (b) reading models, and (c) spelling models. In addition, Chapter 2 includes an explanation of (a) the empirical support for the connection between reading and spelling, (b) the memory and word recognition literature base in priming that supports the connectionist models, and (c) the research base that contributed to the design of the writing conditions and measures used in this study.

The latter section of Chapter 2 includes a comprehensive review of research studies conducted on the link between reading and spelling between 1985 and 2000. A literature search of ERIC (1967-2000) and PsychINFO was conducted using the key words *reading*, *spelling*, *development*, and *research*. A hand search in the published literature was also conducted when the databases were found to be incomplete. Studies selected for inclusion in this section were empirical studies that met the following criteria: (a) Subjects were children in kindergarten through sixth grade; (b) designs were either correlational or experimental with manipulation of instructional variables; and (c) outcome measures included assessment of word recognition accuracy, spelling accuracy, phonemic awareness, or reading miscue or spelling error analysis.

Additionally, a comprehensive review of the priming literature in linguistic memory, word recognition, and spelling from 1983 and 2000 was conducted. A literature

search of ERIC (1967-2000) and PsychINFO was conducted using the key words *priming* and *research*. A hand search in the published literature was also conducted when the databases were found to be incomplete. Studies in this section were chosen by the following criteria: (a) experimental manipulation of the independent variable and (b) the outcome variable was linguistic and related to word recognition and spelling. Studies with school-age children as participants were preferred for inclusion; however, when research with young children was lacking, studies involving adults were used.

Theoretical Framework

Connectionist Theory

Traditionally, cognitive theorists have conceptualized human cognition as rule-based logical reasoning that happens in a sequential, serial fashion. The analogy of a computer has been dominant, with human knowledge stored in a particular location and memory consisting of accessing the particular location. Recently, there has been a challenge to this conception of cognition in the form of connectionist theory. This is a radical and somewhat controversial departure from rule-based symbolic theories in many ways and has been used to model such cognitive processes as language acquisition, typing, spelling, and reading. The next section describes (a) an overview of connectionism and parallel distributed processing, (b) a connectionist model of word recognition (Seidenberg & McClelland, 1989), (c) a larger model of reading and spelling (Adams, 1990), and (c) connectionist models of spelling (Bosman & Van Orden, 1997; Brown & Loosemore, 1994).

What is connectionism?

Connectionism is a new, biologically oriented perspective that attempts to show how rule-based behavior can be approximated through processes that do not involve rules or awareness. Connectionist theorists envision knowledge as a vast network of interconnected elements that individually do not signify anything (Bereiter, 1991). This vast network of units can simultaneously consider many pieces of information or constraints at once. An example of a motor skill is picking up a cup. To be successful, the system must consider simultaneously the relative muscle strength of my arm, hand, and fingers; the position of my arm, hand, and fingers to each other and to the cup; the position of the cup relative to other objects, where other objects (books, pencils, another cup) are in relation to me; and the weight of the cup. If any of these constraints are not considered and taken into account, my grasp could be too hard, crushing the cup, or too weak, letting the cup drop. I could miss the cup entirely or run my hand or the cup into the other objects near by. The simple task of picking up an object requires simultaneous processing of multiple variables in a parallel fashion.

The connectionist processing system considers all possible outputs without committing to any one possibility until all constraints have been satisfied, with each unit determining and being determined by the other units (McClelland et al., 1986). This type of processing is called parallel distributed processing (PDP).

Parallel distributed processing

In PDP, each of the units is connected to all of the other units in a network. Each sends excitatory and inhibitory signals to each other, activating the other units to differing levels of activation and updating the signals based on the signals they receive. The

activation level depends on the weight or strength of the connections between the units. The relative strength of the connections determines the patterns of the units and thus the knowledge represented by the system (McClelland et al., 1986).

The knowledge is in the connections of the matrix rather than in any single connection or individual unit. The system “learns” through adjustments to the connection weights through a covariant learning algorithm (Foorman, 1994). As input-output pairs occur together, connection weights increase, and as they do not occur together, connection weights decrease. These adjustments lead to increasingly optimal patterns that satisfy better and better the existing multiple constraints.

Bereiter (1991) provided a useful analogy to help make the PDP system more understandable. Imagine a room with a pile of Frisbees in the middle, all connected together with rubber bands of varying lengths, thickness, and tension. As you pick up four Frisbees and clamp them to each of the four walls, the whole net will move into a pattern determined by the constraints of the rubber band connections. The pattern of Frisbees satisfies the constraints of the rubber bands. Some Frisbees are on the ground; some are high up in the air; and some are hidden in the middle. The place of each Frisbee simultaneously determines and is determined by the placements of the other Frisbees. If the height above the floor is the activation level and active Frisbees turn black, it is possible to spend time adjusting the rubber bands to change the positioning of the Frisbees to a certain pattern, such as an “A.” This “A” would have an ideal pattern of Frisbees that would make it the most clear. Through slow and careful adjustments to the lengths and tension in the bands, the Frisbees could be moved around in the net to achieve this ideal pattern. It is a difficult process because changing one rubber band

could conceivably change the position of all the Frisbees; thus, it is important to change many rubber bands a little bit.

Now imagine you have the perfect “A” pattern, but you unclamp those particular four Frisbees and clamp four different ones up, thus changing the input. The “A” pattern is no longer looking optimal due to changes to the matrix, but it also is no longer the desired output. The new desired pattern is “B” (or any other pattern). How can you keep the A pattern optimized while also changing the weights to change the pattern to optimally represent B or C or F? The trick is to have many cycles (maybe tens of thousands) of input-output pairs, each time adjusting the rubber bands a little bit to better approximate the current pattern and lead to the next. This will take a long time, and the changes to the connection weights will not be drastic, but eventually the system will settle into a configuration of connection weights that will optimally produce all of the learned patterns when the input stimulus is changed. This is a fairly crude vision of PDP, but it shows how a system can approximate rule-based behavior (letters) without rules, without awareness, and without the meaning being present in any one location in the system.

Computational Modeling

Connectionist theorists use connectionism and PDP to develop computer-based models of how humans think and learn. They have produced models that simulate memory, language acquisition of a rule, spelling, and reading processes (e.g., Brown & Loosemore, 1994; Seidenberg & McClelland, 1989). The evidence supporting connectionist computer models concerns how closely they simulate human performance on the same tasks. The strongest evidence is that the computer models have the same

strengths and weaknesses as human thinkers. An early and very influential model of some of the processes in reading is provided by Seidenberg and McClelland (1989).

Connectionist Models of Reading

Seidenberg and McClelland

Seidenberg and McClelland (1989) applied connectionist theory to the processes of reading. They conceived of a model that includes context, meaning, orthographic, and phonological processors. The four processors are connected by hidden units that receive and send information from each of the processors, as shown in Figure 1 by the arrows going in both directions.

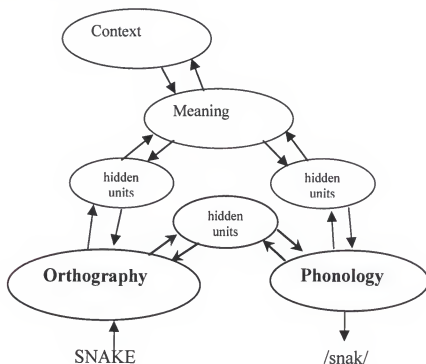


Figure 1. Seidenberg and McClelland's model of word recognition

The four processors progress in a distributed parallel processing manner sending excitatory and inhibitory activations through the system. In this way, the model is simultaneously processing all four types of information about print as it reads. However,

the actual computer simulation of the Seidenberg and McClelland (1989) model only accounts for the connection between the orthographic and phonological processors.

The system begins with all units connected to all other units. As the unit learns through trials, the connection weights between units are changed by small degrees. The whole system slowly moves toward an optimal system of connections and weights as additional input is received. Each time the system receives input, the net shifts to optimize the organization of connections that represents the knowledge associated with the input. Over time, the system “settles” into the most optimal set of connections for all the input and processing is rapid and automatic.

Input that is more similar (i.e., word patterns or phoneme-grapheme redundancies in an alphabetic language) facilitates this “settling” and makes it happen much more quickly than dissimilar input because each pattern of connections is similar to the previous, and the net is not “pulled” drastically in one direction or the other. The fact that activating part of a pattern activates all the units associated with the pattern means that the system automatically and naturally generalizes between knowledge and patterns (Seidenberg & McClelland, 1989).

The hidden units appear to play a crucial role in the processing between the phonological and orthographic processors (the only two modeled). When Seidenberg and McClelland reduced the number of hidden units, the model simulated the same sorts of errors and processing lags displayed by readers with developmental dyslexia. In fact, the connectionist model was also able to simulate the same unusual types of error patterns seen in people with acquired dyslexia (i.e., could read and spell pseudo words but not familiar words, and vice versa). This means that the single processing activity underlying

connectionist models can explain what only the dual route theory of two types of processing was previously able to explain.

Adams

Adams (1990) developed a model of reading built on the Seidenberg and McClelland model (1989). Each of the processors, she explained, is itself a PDP system that is interrelated to the other PDP systems in a PDP fashion (see Figure 8.1 in Adams, 1990). She used a great deal of empirical data to build her model of how readers process print, but to date a computer simulation including all four of the processors has not been developed and tested against human experiences (Adams, 1994).

Orthographic processor

As a reader focuses on the letters in a word while reading, feature receptors are activated in a parallel processing mode to identify each letter. The orthographic processor is the system of connections that is responsible for the letter identification. It is the only processor that receives the actual printed input, and as such is of primary importance. Without a functional and efficient orthographic processor, the entire system is unable to proceed optimally.

As the reader interacts with and reads more and more print, the associations between certain letters are strengthened based on the frequency of their co-occurrences in the alphabet that is being read. The letters that occur together more frequently reinforce each other through excitatory stimulation and letters that occur together infrequently send inhibitory signals to each other. This results in the psychological reality of syllables in words. The letters within the syllable boundaries cohere together more strongly (i.e., have stronger association weights) than the letters at the boundaries of the syllables.

Context processor

The context processor is responsible for constructing the ongoing interpretation of the text as it is being read. This ongoing understanding of the text tends to occur at semantic and phrasal boundaries while the reader pauses to integrate what was just read with the cumulative interpretation. The context processor feeds information to the meaning processor, providing a priming effect in text about a familiar topic. As such, the priming the context provides means the meaning processor does not have to receive as much input from the orthographic and phonological processors to “understand” the text. The context processor also receives excitations from the meaning processor, meaning that the ongoing interpretation of what is being read both depends on and helps determine the word meanings that are being read.

Meaning processor

The meaning processor is connected to the context, orthographic, and phonological processors in an interconnected fashion. It both receives and sends excitatory and inhibitory signals to all of the processors as the meaning of the words is determined. Just like the orthographic processor, the meaning processor is a series of interconnected units that combine together to form the meanings of words. As a child experiences either the concept represented by the word or the printed word in different contexts, the overlapping correlations from experience to experience provide the child’s understanding. For example, a child’s first experience of a cat may be with the family’s gray and white cat named “William.” This provides all the knowledge the child has of the concept of “catness,” and the child may overgeneralize the characteristics of furry, gray and white, four legs, and a tail to every animal he sees, calling all animals

“William.” As he experiences more instances of animals and is told the correct name for each one, the resulting strengthening and weakening of the connections will result in separation of concepts and the child will soon understand the distinctions around the concepts of “animal,” “cat,” “this particular cat our family owns,” “dog,” “horse,” and so on. In addition, the more often a child encounters a word in print, the similarities of meaning between contexts will result in a growing core concept and distinguish it from similar constructs.

Phonological processor

The phonological processor is connected in a parallel-distributed fashion with the other processors as well. The phonological processor provides a sound representation of the words that are being perceived by the orthographic processor. Because expert readers overlearn the orthographic patterns in words to the point where they perceive the letter units as a whole, and the information coalesces so quickly with the meaning of each word, one may wonder what function the phonological processor serves when it appears good readers read primarily through the orthographic-meaning route.

The phonological processor is engaged in every experience with letters and words whether we realize it or not. It provides valuable redundancy to the system that allows it to display the quick and effortless reading of experts. In fact, when expert readers are not allowed to subvocalize, their reading rate and accuracy drop. The phonological processor provides important backups to the orthographic and meaning processors. The phonological processor has another critical role in the reading process that is most evident in early readers, although all readers use it. The phonological processor has an internal loop that recodes the orthographic information and reactivates the entire system.

Without this recoding, young readers would not be able to decode unfamiliar words and readers that are more expert would not have enough verbal memory to hold the meanings of words and construct their understanding of the text. Good readers pause at semantically appropriate places in the text, phonologically recode what was just read, integrate this information into the ongoing interpretation, and then continue forward. Without the phonological recoding, the verbal memory capacity would be insufficient and readers would not be able to remember enough to integrate meaning across phrases and sentences (Adams, 1990). That this recoding takes place extraordinarily quickly in good readers does not mean it is not crucial.

The four processors work together in a parallel-distributed fashion and simultaneously process the orthographic information perceived by the feature receptors in the orthographic processor. Because they are interrelated, they can provide support and compensate for the weaknesses of each processor. The redundancy of the four means that readers can understand degraded text just about as well as regular text and make sense of ambiguous spellings (Adams, 1990).

Adams makes the point that spelling words also uses this interconnected system of four processors. Instead of the input coming from the orthographic processor, it enters the system from the phonological processor. Just as reading is decoding print into sound, spelling is encoding sound into print. Knowing a word's spelling strengthens the orthographic processor, and Adams stated that unless a child has a representation of a word in her orthographic processor, she will not be able to spell it. Spelling difficulty is a sign that the orthographic connections need strengthening. There is still much work to be

done on how spelling and reading interconnect, and investigation of how the same processors are used is needed.

Connectionist Models of Spelling

Brown and Loosemore

The Brown and Loosemore (1994) model is based on Seidenberg and McClelland's (1989) parallel-distributed processing model. As Seidenberg and McClelland did, Brown and Loosemore constructed a computer model of spelling that incorporates only the orthographic and phonological processors connected by hidden units. The model was able to learn to spell three different types of words: regular (e.g., *kill*, which shares spellings of those phonemes with many other words), irregular (e.g., *soap*, which has many other competing spellings for those phonemes), and unusual (e.g., *bulb*, which has no phonological neighbors). Successful spelling in the model depended on the network having the correct connection strengths between the phonological and orthographic units. The model was able to adjust the connection weights to spell all 225 words in its corpus with minimal errors. These results mirrored the same types of errors that young children produced on the same corpus of words. This fit of data between the spelling of the model and of the children was accomplished even though the model did not have any rules to translate sound to spelling. The Brown and Loosemore model has much promise, but it is necessary to gather more information about how the processors work together to spell words correctly.

Bosman and Van Orden

Another connectionist model of spelling based on Seidenberg and McClelland's work was formulated by Bosman and Van Orden (1997). As with all connectionist

models, the spelling model developed by Bosman and Van Orden (1997) relies on interactive feedforward information between different systems in a parallel distributed fashion. They propose that there are three different systems working together: the semantic nodes, phonological nodes, and letter nodes.

Bosman and Van Orden suggested that there are different connection weights between the three nodes. They called these connection weights bi-directional positive feedback loops. They suggested that the bi-directional positive feedback loops are strongest between the phonological and letter nodes. This is due to the redundancy in our alphabet system and due to the fact that there is a systematic relationship between letters and sounds. Each time a person processes a sound or a letter, the opposite is also present. The redundant information present in an alphabetic language means that the same letter and sound patterns keep showing up together across words.

The next strongest set of bi-directional correlations is between the semantic and phonological nodes. This is due to the influence of oral language. People learn to speak long before they learn to read and write, and continue to speak more on a daily basis. The weakest set of connections is between the orthographic and semantic nodes. Bosman and Van Orden explained that this is due to two factors. First, we have less experience with letters and meaning than we do with sounds and meaning (due to asymmetry between oral and written language experiences). Second, there is not a direct and systematic relationship between letters and meaning like there is between letters and sounds. There is some consistency between morphemes and spellings, but there is not nearly the redundancy that there is between letters and sounds.

Bosman and Van Orden stated that once this asymmetry is in place, it is self-perpetuating because reading strengthens the connection between letters and sounds with every instance of word recognition. Also, in theory, if a strong positive bi-directional feedback loop establishes itself between the phoneme and semantic nodes before the feedback loop between the letters and semantics (because of the influence of oral language), then there is reason to think that the system will rely much more on the two stronger pathways.

The spelling models hold promise but are not as completely developed as Adams's model. They are in the beginning stages of development and still need theoretical and empirical support. Because it is more complete, Adams's model was used as the framework for this investigation.

Theoretical Framework Summary

In Adams's parallel-distributed model of reading and spelling, the contextual, morphological, orthographic and phonological processors work together in an interconnected fashion to both decode and encode text. A single unitary mechanism is capable of explaining the processes that have been observed in proficient and dyslexic reading and spelling. According to the Adams model, there should be support for the parallel nature of reading and spelling in the empirical literature and in how reading and spelling develop in young children. The empirical knowledge in this area is considered next.

Support for the Theoretical Connection between Reading and Spelling

The empirical support for the similarities in reading and spelling processes is discussed in the following section. This is followed by an explanation of the reading/spelling developmental sequence and supporting research.

Several findings from empirical research support the idea that reading and spelling are “one and the same, almost” (Ehri, 1997, p. 264). One is the near-perfect correlation (after correcting for measurement error) between reading and spelling standardized measures (Ehri, 1997). Another is the finding of Ehri (1991) that young children learn the pronunciation of words faster when they see the spelling at the same time. Knowing the spelling of a word changes how one perceives its sound (Ehri, 1991). For example, when readers were asked how many sounds were in *rich* and *pitch*, which sound identical except for the initial phoneme, they counted the *t* in *pitch* as another phoneme and said it has four sounds. Ehri and Wilce (1987) found that children learned the individual sounds within a word faster when the spellings were in front of them. They also found that children who had read words with medial alveolar flaps (e.g., *glitter*, *Cadillac*) spelled the words with the correct letter (either *t* or *d*) more often than children who had not read the words did. First-grade children taught to sound and blend words to read them could spell better at the end of the year than children who had not been taught those skills (Foorman et al., 1991). Ehri (1997) also cited evidence that languages with a written form have less phonological drift (change in pronunciations over time) than languages without a written form. Printing the alphabet from memory, nonword decoding, and verbal IQ are three of the four best predictors of spelling accuracy in the primary grades (Berninger, 1999), using the same orthographic and phonological

knowledge needed for both reading and spelling and lending support to the connection between reading and spelling. Children appear to use the same knowledge about language and print in reading and writing. Another place to look for these same phenomena is in the development of spelling and reading.

Reading and Spelling Developmental Sequence

The developmental sequence of reading and spelling are discussed in the following sections. Ehri (1997) and Moats (1995) provided a rationale for the integration of the spelling and reading sequence of development (Table 1). In addition, they provided correspondences between the two bodies of literature. Their organizational scheme is used in this discussion.

Table 1
Spelling and Reading Developmental Sequence Correspondences

Reading Stages	Spelling Stages
Prealphabetic, logographic	Precommunicative
Partial-alphabetic	Letter-name, semi-phonetic
Full alphabetic	Phonetic, phonemic
Consolidated alphabetic, orthographic	Transitional, morphemic, within-word pattern

Traditionally, reading and spelling development have been characterized as occurring in qualitatively different stages where children use different strategies and types of knowledge. This view has been recently challenged by a variety of researchers. There is evidence that traditional developmental theories do not take into account all of the knowledge and skills that young children have even in the earliest stages of

acquisition (Cassar & Treiman, 1997; Goswami, 1989; Nation & Hulme, 1996; Treiman & Cassar, 1997). An argument for a conception of spelling and reading development that is more a developmental sequence rather than a series of qualitatively different stages is being made in the literature (see, e.g., Moats, 1995). Goswami and Bryant (1990) concluded “a great deal of development takes the form of children just getting better at strategies which they use right from the start” (in Goswami, 1999, p. 211).

A developmental sequence fits well with the connectionist theory of gradually settling connection weights that increasingly approximate the optimal connection weights for automatic and expert processing. What produces the changes seen as children develop is a change in the knowledge encoded by the network. As the model is exposed to more and more words in reading and writing, the network begins to incorporate more knowledge about the statistical relationships between sounds and spellings as the children encode and decode words. Thus, developmental change occurs as a result of changes in the knowledge base without qualitatively different strategies used in different stages of development.

The stages are more logically conceived as points on a continuum of development. The stages as outlined in the literature continue to be used in this review; however, it is important to remember that the processes and knowledge represented at various stages are tendencies that children follow, not absolute descriptions of abilities or processes. The various points on the development continuum in reading and spelling have many terms (e.g., Byrne, 1991, 1992; Frith, 1985; Gough & Juel, 1991; Gough, Juel, & Griffith, 1992; Henderson, 1990; Moats, 1995; Treiman, 1992, 1997). For clarity, Ehri’s terminology is used throughout this discussion.

Stage I: Prealphabetic Reading and Preliterate Spelling

In the first stage, the converging evidence shows that children are just beginning to learn about print. Young children appear to know very little about the alphabet and do not know the names of the letters. In addition, they do not have the concept of a word or the connection between print and speech although they do seem to understand that print is important and serves a purpose (Ehri, 1997).

Reading

Children at this stage in the developmental sequence use paired-associate learning to identify words. They pick a salient visual cue for each word to help remember pronunciation and meaning. The cues that they pick vary depending on the words they are trying to learn (Gough et al., 1992) and do not have to do with the letters in the words. Children attend to the Golden Arches of McDonald's, the distinctive colors of a label, or the picture on the cereal box to "read" the words.

Masonheimer, Drum, and Ehri (1984) found that young children who were able to read "Pepsi" were not able to state what was different when "Xepsi" was written in the same font and with the same red and blue design for the logo. Also, the children were not able to read "Pepsi" without the distinctive lettering or colors. In another experiment, children were taught to read words on index cards, one of which had a thumb smudge on it (Gough et al., 1992). The children apparently attended to the thumb smudge as their visual cue to identify the word, because they were unable to read the word when it was written on a card without a thumb smudge and produced that word when shown a card with just a thumb smudge or with the smudge and another word. In addition, the

pronunciations of the words at this point are not stable. Children read CREST as “brush teeth” or “toothpaste” depending on the situation (Ehri, 1997).

Spelling

Children at this point in the developmental sequence produce writing that progresses from scribbles to wave-like forms to letter-like forms to the letters in their name (Ganske, 2000). Children understand that print looks different from drawings and “write” differently than they draw. Word spellings learned at this stage have been learned as whole words, which means they are either completely right or completely wrong. Because children have not yet understood the special nature of letters, there are random symbols and numbers included in their writing (Moats, 1995).

Thus, one can see that children are attending to the print environment but have not realized the importance of the letters or the fact that words are speech written down. In the next stage, children show in both reading and writing that they are beginning to make that connection.

Stage II: Partial Alphabetic Reading and Letter-Name Spelling

At the second stage, young children have learned many, if not all, of the letter names. They also understand the communicative value of print and that print is speech written down. They have begun the process of understanding how print maps to speech and vice versa (Ehri, 1997). This seems to take place in alphabetic languages other than English, as well. There is evidence of young Portuguese-speaking readers using phonetic cues although they had not been explicitly taught sound-symbol relationships and did not appear to understand the alphabetic principle (Cardoso-Martins, 2001).

Reading

Children at this stage still attend to one or two salient cues when learning words, but they generally use letters and letter-sounds as the cues. The children do not attend to all letters in a word but pick one or two cues (usually either the first or last letter). This often leads children to confuse words that begin or end with the same letters. Children generally know many of the letter names, and it is thought that letter-name knowledge is helpful in this process (Treiman, 1992). The memory load is less for children than it was in the first stage, because the associations they are making are not arbitrary. The connections between graphemes and phonemes are systematic and patterned, which provides support to the developing reader. Ehri (1991) found that, when taught to read nonword orthographic patterns as representatives of real words, novice readers who knew the alphabet learned words with phonetic cues (e.g., JRF for “giraffe”) better than words with visual cues (WBc for “giraffe”). Prereaders who did not know the alphabet found the visual cues more helpful.

Spelling

Letter names appear to help children with spelling words as well. Children appear to rely heavily on letter names to help with representing sounds. Examples are HLP for “help,” LFT for “elephant,” and RUDF for “are you deaf” (Ganske, 2000). The young spellers and readers seem to understand that writing is a way to communicate speech and that letters symbolize those sounds. Moats (1995) remarked that children are most likely to spell words with only consonants and do not appear to understand completely the concept of a word, because they generally run their letters together and often use a single letter to spell an entire word.

Treiman and Cassar (1997) stated that researchers in the past did not credit young children with all the knowledge they are using. They contended that letter-name spelling is not as widespread and common as has been believed. Treiman and Cassar found that children use letter-names in different amounts depending on the sound composition of the letter-name. Some letter names (r, l) are almost always used to represent that sound while others (m, n, f) are almost never used. This is because of the very tight bond between the vowel and consonant sounds in the names of r and l. The other letter names are easier to segment the vowel sound from the consonant sound in the name. In addition, the vowel sound in the name “r” is unique—no other letter name has /a/ in it. Other letter names (e.g., b, c, d, e, and z) share the vowel sound /i/, which may make it easier for children to segment. Finally, Treiman (1992) found that preschoolers would spell the nonword /gar/ as R rather than G (which one would expect as the first letter), showing their growing awareness of the connection between phonemes and graphemes. Young children appear to be paying attention to the phonological structure of words, even in this early stage.

Transition from Partial Alphabetic to Full Alphabetic

Children cannot continue to add words to their vocabulary by attending to one or two salient features. As they learn more and more words, it becomes increasingly difficult to identify unique cues for each word and easier to confuse words with similar letters (e.g., share, shave, slave, stave, save, and pave). Additionally, the problem of reading novel words becomes larger and larger because there is no way to figure them out (Gough & Juel, 1991; Gough et al., 1992). Context does not help readers with this process much because the longer or more rare a word is (as most content words are), the

less predictable it is. Additionally, remembering the spelling of a word is incredibly difficult without a pattern to assist.

In order to continue developing as readers and writers, children need to understand the alphabetic principle and “crack” the cipher (Gough et al., 1992). Phonemic awareness is especially important at this point because it is only when children can hear and distinguish the individual sounds that they can learn the cipher in order to read and spell. Spelling accuracy is especially dependent on the development of the ability to segment phonemes. Without the ability to hear each individual sound, it cannot be represented by a grapheme. The sounds and names of the letter shapes provide the connections necessary to build this understanding (Adams, 1990; Ehri, 1991). Byrne (1991, 1992) pointed out that children do not infer the phoneme-grapheme connections from experiences with whole words. They need explicit experiences with grapheme-phoneme and phoneme-grapheme relationships in order to begin to segment sounds and learn the alphabetic principle. If they do not “crack” the cipher, they cannot move on into full alphabetic knowledge (Gough & Juel, 1991; Gough et al., 1992).

Stage III: Full Alphabetic Reading and Phonetic Spelling

Full alphabetic reading and phonetic spelling constitute the third stage of development. In order to be considered at this point in their development, readers and spellers must have phonemic awareness and the ability to segment and blend sounds (Ehri, 1997). They must have mastered the alphabetic principle in English. Children at this stage apply grapheme-phoneme patterns in reading and phoneme-grapheme correspondences in spelling.

Reading

Once they reach the full alphabetic point, children have stable, unique pronunciations for words. They have learned the letter-sound correspondences and are learning orthographic patterns and conventions. That is, they have discovered the “cipher” of alphabetic languages (Gough et al., 1992). In Ehri’s terms (1995), they are amalgamating the orthographic, phonological, and morphological identities of the words in their memory. Children in this stage are able to decode more accurately and fluently than before, and they can read nonwords as well as real words. In fact, children’s ability to read nonwords is a measure of their mastery of the cipher. This mastery is not taught explicitly—what is taught in phonics is not what children acquire as the cipher (Gough et al., 1992). Instead, the explicit experiences with words, patterns, phonemes, and graphemes provide the “raw material” necessary for the cipher to be acquired. Gough and his colleagues suggested that the cipher consists of hundreds of implicitly learned relations between print and sound, which Foorman (1994) stated can be thought of as weighted connections in a neural network. This idea of implicit learning follows from the connectionist explanation of how the neural network “learns” to read words and nonword fluently. The connections are strengthened and weakened with every sound-symbol pairing the child encounters, and exposing the child to pairings is the basis of many phonics programs.

Spelling

At this stage, children are able to represent all the surface features of words, but do not represent the deeper phonemic or morphological features (Moats, 1995). Moats referred to this stage as “spelling by mouth” rather than by sound because children rely so

heavily on stretching the words and the articulatory-phonetic feedback and sound segmentation stretching provides. This stretching of words often means that children represent more sounds than conventional spellings do. For example, a child could spell “blouses” as BALAOSES because of stretching out the diphthong. Moats also pointed out that children at this point in their development can reread their invented spellings as well as they can read standard spellings. She also contended that the principle of successive approximation is very active as the children incorporate an increasing knowledge of sounds and letters. The children become better and better at the processes they have been using all along. Moats concludes that, according to connectionist theory, the association weights between most common sounds and symbols are being strengthened to the point of automaticity and as that happens the children are increasingly able to move beyond the surface features of words and represent more complex multilevel connections.

The traditional developmental stage literature does not characterize children as using orthographic knowledge at this point in their development in spelling. The orthographic stage is one of the last. In contrast, Treiman and Cassar (1997) provided evidence that in fact young children are sensitive to orthographic patterns and use them quite early. Again, they concluded that researchers are not giving very young children the credit they deserve. Treiman (1992) found that first graders’ mistakes in spelling followed the regularities of the English orthography. For example, they never began words with “CK” but used it medially and finally in words. In experimental conditions, preschoolers, first graders, and second graders all showed sensitivity to allowable patterns in English orthography, even in nonwords. They picked “nuss” as more

word-like than “nnus,” “geed” more than “gaad” and “nuck” rather than “ckun.” The knowledge children displayed was not terribly complex, but it showed that even children in the letter-name and phonetic stages of spelling development were attending to orthography (Cassar & Treiman, 1997).

Treiman and Cassar (1997) also pointed out that children’s sensitivity to morphology is evident much earlier than previously thought. They did a number of experiments with alveolar flaps that sound the same but are spelled with either d or t depending on the word. They found that children spelled words with two morphemes (e.g., *dirty*) with the correct letter more often than words with one phoneme (e.g., *duty*), showing that the children were using knowledge of the root to spell the inflection.

Stage IV: Consolidated Alphabetic Reading and Within-Word Patterns Spelling

In the fourth stage, children are considered to read and spell more by analogy than by sound. They have mastered the letter-sound correspondences and are now able to focus on patterns found between words and use them to decode or encode unfamiliar words.

Reading

Ehri (1991, 1995, 1997) stated that this last stage is when children learn to read by analogy. The consolidation of knowledge allows children to operate with morphemes, syllables, onsets, and rimes. The larger units that become consolidated reduce the memory load for readers, and the effortless reading fluency seen in expert readers becomes more evident (Adams, 1990).

Ehri (1995) stated that older readers are more sensitive to letter-concurrences than younger readers are. Words with familiar word patterns are read more accurately than

unfamiliar patterns even when they had the same grapheme-phoneme correspondences (Treiman et al., 1990), showing an increasing knowledge of orthographic patterns.

Another examination of sensitivity to orthographic patterns found that fifth graders read words with common letter patterns more rapidly than unfamiliar letter patterns while second graders were more affected by how decodable the words were and not affected by the commonality of the letter patterns (Juel, 1983).

Spelling

Children at this point in the developmental sequence are able to spell sight words, spelling by analogy becomes dominant, and children use visual and morphological information in their spellings. They apply the constraints of orthography, phonology, and morphology more consistently and start to realize that graphemes are usually more than one word (Moats, 1995). Spellers include at least one vowel per syllable but not always in the right location. They abandon simple linear translation of sound to print and use all the knowledge at their disposal, sometimes leading to strange errors as they overgeneralize patterns (Moats, 1995). As students master these more complex and larger “chunks” of words and patterns, they become more expert and can spell and read multisyllabic words correctly. They enter the stage of morphophonemic spelling (i.e., integration of meaning, sound, and orthography) that is generally correct (Moats, 1995).

Young readers and spellers appear to use the same knowledge about language to decode and encode text as they develop. This phenomenon can be explained within the connectionist framework. Because activating one part of the PDP matrix spreads activation to the other parts, similar patterns are represented whether the system begins with orthographic or phonological information. The sound of a word has been shown to

activate its spelling (Campbell, 1983, 1985; Nation & Hulme, 1996) and meaning (Nation & Snowling, 1999). The system appears to be successively approximating optimal weights and connections as it develops and learns. Evidence of early use of phonological, orthographic, and morphological information can be found in very young readers and spellers, but it bears little similarity to the expert and fluent processing older readers and spellers exhibit. The system becomes increasingly optimized as the child encounters more alphabetic information.

Asymmetry Between Reading and Spelling

Although reading and spelling are highly related processes and appear to use the same system, they are not identical. Bosman and Van Orden (1997) explained this in two ways. First, they stated that, in English, there are many more possible spellings for a phoneme than there are readings. For example, they stated that there are 36 ways to spell /shi/ but only two ways to pronounce “she”—with a long or short e sound. This is common to many languages besides English. Another source of difficulty can be explained by their model. If there are many ways to spell a sound, there must be a way to determine which is the correct one from all the possibilities—a way to resolve the inconsistencies. For example, /hip/ could be spelled “heep,” “hepe,” or “heap.” To decide which is correct, one must rely on the relatively weak link between the letter and semantic nodes. Even strong contextual support has to go through the meaning processor and is mediated by the relatively weak link. So, there is less contextual and meaning support for spelling (semantic and letter node connections) than there is for reading (semantic and phoneme node connections). This is a possible explanation for the

relatively common case of being able to read more words than can be spelled or people with dyslexia tending to have more difficulty with spelling than reading.

Berninger (1999) also discussed the asymmetry between spelling and reading and explained the phenomenon by noting that word recognition difficulties can be remediated more quickly than spelling problems in the same amount of tutorial time. She explained this phenomenon in the form of five hypotheses. First, she noted the asymmetry of mapping sounds and symbols. Second, production tasks are considered more difficult than recognition tasks. When a child reads a word, she only needs to find a match in her verbal dictionary for this word, while when a child writes a word, she needs to generate the correct spelling. Third, many poor readers and spellers may have impoverished phonological mental representations of words that do not provide a rich enough data base for establishing connections between sounds and spellings. This is more of a problem in spelling than reading, because it is easier to choose among approximations in reading than in spelling. Fourth, there may be impoverished orthographic representations of words. This is also more of a problem during spelling than reading because during reading the correct written form is always present for repeated attempts to decode it, but in spelling a child has to rely solely on a visual memory that may be poorly formed. Then the child has to resort to sounding out the word and representing the phonemes as best she can. Finally, there is less contextual support in spelling than in reading. Context narrows the possibilities more in reading than in spelling. For example, consider the sentence, "I like reading books to my teddy bear." When reading it, the phonological approximations of "reading" are more likely to yield a solution that makes sense in the

sentence than do written approximations (i.e., *reeding* and *reading* are equally reasonable spellings without more support).

Spelling and reading appear to be like two sides of the same coin; they have different images but share the same base metal and structural components. Readers and spellers seem to use context, meaning, sound, and orthography either to encode or decode text. One way to measure how linguistic information is used in reading and spelling is by priming the processors. There is evidence of strong priming effects on word recognition latency and accuracy as well as other linguistic processes, and empirical evidence of these same priming effects for written language is beginning to accumulate. Providing information before target-processing holds promise for providing a way to obtain support for the Adams model and connectionist theory.

Priming Research

What Is Priming?

Priming occurs when “the processing of a word (the target) is facilitated by a preceding stimulus (the prime)” (Forster, 1999, p. 5). The critical factor in priming is not whether the word was processed recently but rather whether or not the previous processing was relevant to the next task (MacLeod, 1996). Priming appears to be process-specific. It is restricted to facilitating repetition of processing previously applied to a stimulus and does not seem to extend to influencing performance on a different task involving the same studied materials (MacLeod, 1996). In reading, priming can be seen in the speed of identification of a target word as a function of a recent experience with the word itself or with words related along a dimension of interest (Rueckl et al., 1997).

These domains of interest include semantic relationship, morphology, phonology, and orthography.

According to Forster (1999), the most common interpretation of priming is that the representations of the prime and target are interconnected or overlap in the brain somehow such that activating the representation of the prime automatically activates the representation of the target word. The effect of prior processing on memory performance depends on the amount of overlap between the mental operations involved in the prime and the target word (Rastle & Burke, 1996). The greater the overlap in process between two occasions (initial study/exposure and later test), the more successful remembering will be (MacLeod & Masson, 2000). The priming effect even takes place when the prime is presented at such a short duration that the subject is not consciously aware of it (Forster, 1999) and without knowledge that the prime could prove useful later (Nation & Hulme, 1996).

The majority of the priming research is in the memory and reading experimental psychology literature with minimal work in spelling. There has been no research applying this highly controlled technique in natural classroom settings.

Measurement methodology

Generally, priming effects are measured by the difference in latency of response between primed and unprimed conditions. There are many methods to measure this difference in latency. The best methods are indirect methods that are not contaminated with explicit conscious recall of the primed information (MacLeod, 1996).

The following sections present the priming literature in increasing order of relevance to this study and effect on language-based processing. Repetition priming (e.g.,

attitude/ATTITUDE) has shown the strongest effect; orthographic (e.g., aptitude/ATTITUDE) and morphological priming (e.g., sent/send) have the next strongest effects (Forster, 1999). Semantic relationships (e.g., cat/dog, broom/floor), word order (example?) (Hartsuiker & Westenberg, 2000), and cross-language translation priming (e.g., *perro*/dog) have also shown facilitative effects (Forster, 1999). The majority of these priming conditions were compared to a no-priming condition where the preceding stimulus has no relationship to the target word (e.g., harmless/attitude).

The following types of priming and their effects on word recognition and reading-related linguistic processes are presented: (a) semantic priming, (b) morphological priming, (c) form priming, (d) repetition priming, (e) phonological priming, and (f) phonological and orthographic priming in spelling.

Semantic priming

Semantic priming refers to the presentation of a prime that is semantically related to the target word (e.g., nurse/doctor). It is important to distinguish between semantic and associative priming, so care is taken to present a variety of semantic relationships (categorical and functional) that are both associated and unassociated words (Nation & Snowling, 1999).

Nation and Snowling (1999) found that when average children heard a word, they automatically accessed the semantic information about its meaning. They showed robust priming effects from words that are category coordinates as well as functional pairs. Children with reading comprehension problems showed a different pattern of priming. They showed priming effects on functional pairs but not on unassociated category coordinates. Nation and Snowling concluded that poor comprehenders are sensitive to

concrete semantic relations that are associated in the real world but not more abstract relationships. Sixth-grade Korean readers showed evidence of semantic priming effects (e.g., song/music) as compared to nonsemantically related primes (e.g., skirt/music; Kange & Simpson, 1996).

Laxon et al. (1995) asked children aged 7 to 11 to read pseudohomophones. Pseudohomophones are nonwords with the pronunciation of real words but not the orthography. For example, *TODE* is a pseudohomophone of *towed* and *toad*. These words were either primed by a semantic prime related to the real word the nonword sounded like (e.g. *string/roap*) or were unprimed. Control nonwords that did not sound like real words were also either primed by a semantically unrelated word or unprimed. Laxon et al. (1995) found that primed items elicited significantly fewer errors than unprimed, and this effect was larger than the orthographic neighborhood size effect. They also found that the semantic priming was less effective for the most-skilled readers (class 6). The participants had more correct readings when the items were pseudohomophones rather than just nonwords. Laxon et al. also found that the children were more likely to read words correctly when the words had a large number of orthographic neighbors. A nonword with a large orthographic neighborhood is easier to pronounce because it can be read analogously with the endings of a large number of words sharing the body. This analogy takes place through spreading activation in the orthographic processor (Adams, 1990).

Morphological priming

Like many of the types of priming reported here, morphological priming has been investigated in both the memory and word recognition literatures. Morphological primes

have morphological properties that are shared in one way or another with the target words. Priming effects are measured against a baseline condition in which targets are either presented without primes or preceded by morphologically unrelated primes (Drews, 1996). For example, a prime could be a regularly inflected version of the same word (e.g., talked/talk) or an irregularly inflected word (e.g., bought/buy). Prefixed and suffixed derivations can be used (e.g., distrust/trust or trustful/trust), as well. Compound words (e.g., head/rest or head/work) or bound root words (e.g., submit/permit) also can be used.

Numerous studies have shown that speed and accuracy of word reading is facilitated by the presentation of both the same word and morphologically related words. Morphological priming has been found in languages other than English (e.g., Chinese, German, Welsh) (Drews, 1996; Rueckl et al., 1997).

Working with university undergraduates, Rueckl et al. concluded that morphological priming is a robust effect that is not only due to orthographic similarity. From their first experiment, they found that the largest priming effect was from repetition priming, then morphological, and then form. The unprimed condition did not result in significantly different latencies. In their second experiment, Rueckl et al. again found the largest effect was from repetition priming. However, the next largest effect was from primes that were morphologically related/formally similar, then morphologically related/formally dissimilar, then unprimed.

From Adams's PDP theory (1990), one would expect the most priming when morphology, form, and sound are all similar (e.g., make/made) rather than when dissimilar (e.g., buy/bought; took/take) because of the level of activation in the matrix.

Three systems are being activated at the same time rather than just one. The amount of overlap between the prime and the target is larger than with words that only share one feature.

Form priming

Form priming is a term used in memory research. In the word recognition and spelling literature, it is referred to as orthographic analogy (or priming). Orthographic priming is discussed more fully in relation to repetition and phonological priming.

In direct form priming, the prime and target are related in form but not in any other aspects (i.e., morphological, semantic). For example, *blank* would be primed by *plank* and *card* by *CAR* (Zwitserlood, 1996). Form priming effects have been found with initial overlap, target continued in prime (pillow/pill), initial overlap, fragment primes (e.g., stree/street), initial overlap, one segment (e.g., sand/strett), rime overlap, more segments (klenk/blank), and rime overlap, only one feature mismatch (e.g., dask/task) (Zwitserlood, 1996). Because part of the priming could be due to phonology as well, it is difficult to determine what causes the exact effects of form priming. According to connectionist theory, form and morphological priming are manifestations of the same underlying process: the strengthening of attractors via the learning mechanism (Rueckl et al., 1997).

Repetition priming

Repetition priming is the presentation of a word as a prime and then again as a target word. The overlap of processing between the prime and target is complete, so it is not surprising that repetition priming produces such strong effects.

While investigating tip-of-the-tongue phenomena with older adults, Rastle and Burke (1996) found that recent processing of a word increased the accuracy and speed of its perception or production even without awareness of a relation between the prior experience and facilitation of performance. Rastle and Burke stated that repetition priming provides improved performance in perceptual tasks such as lexical decision and word identification and on production tasks such as word fragment completion, picture naming, and general knowledge questions.

MacLeod and Masson (2000) asserted that prior processing of a word (whether through reading or generating it) results in reliable priming on speeded word reading tasks. They found improvement in reading tasks with University undergraduates in all repetition priming conditions. Facilitation from repeated words can span quite long intervals filled with intervening words (MacLeod, 1996). MacLeod also found that facilitation increased as target words ranged from high to low frequency.

According to connectionist account theory, repetition priming is one consequence of a learning process that modifies the weights of connection matrices after a resonant state is set up. The change in weights facilitates subsequent processing of that word (Rueckl et al., 1997).

Phonological and orthographic priming

Phonological priming refers to the possibility that the availability of a rhyming pronunciation via the prime may itself trigger correct reading of test words, even when an analogy based on orthography is inappropriate (e.g., head/said) (Goswami, 1999). Goswami suggested that when children make analogies in reading, it requires relational knowledge. "In the domain of reading, this relational knowledge is phonological

knowledge" (p. 211). There is evidence from phonological priming studies that phonological information plays an early and automatic role in the recognition of printed words through phonological overlap between the prime and target which facilitates processing of the target.

Goswami (1990) investigated whether young children (reading age of 6 years) use phonological or orthographic information to make analogies in reading. Goswami asked the children to read a list of words with either a clue word or meaningless rime in view. The children were told that the clue would help them read some of the words on the list. In the clue word conditions, the primes were in sight entire time. Goswami found that the most priming occurred for analogous words, while much less priming occurred for phonological primes although the phonological priming effects disappeared when the same words were tested in connected text (Experiment 2).

Goswami concluded that young children do not use phonological information but instead rely on orthographic information when making analogies, because the clues she called analogous had the most facilitative effect. Within Adams's model, this result can be explained in a different manner. It is not surprising that the analogous words would provide the most priming effect because they share both phonology and orthography. Both systems are being activated at the same time, providing more redundant information to the system. The young readers were using both types of information. This effect is similar to the results of Rueckl et al. (1997) when the primes that shared both morphological and orthographic similarity had the most priming effect. By providing more activation, the processing overlap between the prime and the target is increased, thereby increasing the effect.

Booth et al. (1999) stated that the brief exposure paradigm is especially useful for exposing prelexical processing because the amount of processing that can occur is limited. They studied second- through sixth-grade students using target word recognition and three priming conditions: pseudohomophone, orthographic, and control. The orthographic and pseudohomophone priming was facilitative for good and older readers, even at exceptionally short intervals. Poor readers showed less priming than good readers and only showed significant priming at longer durations. Booth et al. concluded that poor readers need more processing time to benefit from the prime. There were age- and skill-related increases in priming effects even in very short durations that precluded complete processing of the prime or the target. Booth et al. stated that these findings suggest that phonological information is activated early in the word recognition process and that this activation occurs in tandem with orthographic activation. They suggested that skilled reading “involves the rapid interactive convergence of orthographic and phonological information. The orthographic and phonological priming effects also appear to be automatic because the extremely short presentation duration of the prime and target prevented the strategic use of context” (p. 17).

Apparently, placement of the sound and symbol priming information is important because fourth graders showed significant reduction in naming latencies to target words when primes shared final trigram (rime unit) with target words (e.g., weed/seed), but word initial trigrams (e.g., leap/lean, pine/pink) did not facilitate word recognition (Hanson & Bowey, 1992).

Ziegler et al. (2000) used another type of priming called incremental priming to investigate phonological and orthographic priming effects. Incremental priming is a new

method of investigating priming effect. First, a short prime duration where the priming effects are minimal (within-condition baseline) is found. Then the prime duration is increased. If performance improves with respect this within-condition baseline, then the prime has facilitated target processing. If performance decreases, then the prime has inhibited target processing. The authors found that priming in deciding whether a symbol is a letter or not seemed to rely primarily on visual shape overlap between prime and target while priming in letter naming appeared to rely primarily on phonological information. In lexical decision-making, primes with minimal visual (orthographic) but maximal phonological overlap (anir/nerf) produced reliable facilitatory priming effects. Orthographic priming appeared to be stronger at shorter prime durations and phonological priming stronger at longer prime durations.

Booth et al. (1999) argued that phonological activation is quick, automatic, general, and important in reading and is supported by the Adams (1990) model. Patterns of activation in the orthographic and phonological systems settle quickly because of the redundant and patterned relationship between orthography and phonology in English.

Echoing Bosman and Van Orden (1997), Booth et al. stated that the

relationship between semantics and phonology or orthography is not as systematic so the semantic system settles more slowly than the other systems. In other words, the self-consistency of letters to sounds is greater than the self-consistency of letters to meanings or sounds to meanings, and therefore there is rapid interactive convergence of orthographic and phonological information during word recognition. (p. 5).

Priming in Spelling

The research on the effect of priming on spelling focused on measuring phonological and orthographic priming on spelling accuracy. The spelling accuracy was

measured using nonwords and the presence of target spelling patterns found in the priming words.

Campbell (1983) stated that there is evidence that spelling of a heard word will influence responses to words (i.e., hearing "wreck" would speed responses to "wreckage" but not to "record"). She proceeded to test this claim with university students. Participants were asked to listen to a list of words and write down only the nonwords. Campbell measured how similar the spelling of the nonwords matched the spelling of the word heard before it. For example, if the nonword was spelled "splain" after the prime "brain" was presented, but "splane" after the prime "crane," priming effect can be determined. Every subject gave more primed spellings than any other type of spelling. Sixty-five percent of responses were spelled like the primes even though the word itself was not written down or explicitly processed (Experiment 1). In Experiment 2, Campbell tested whether this priming effect would be mediated by putting another word between the prime and the target. This was not found to affect the priming effect. The primed spelling was used significantly more often than the alternate primed spelling. The type of filler made no difference to the extent of priming.

In 1985, Campbell expanded her investigation to the nonword spelling of children (ages 9 to 11). She used the same design with the addition of a control group who spelled the nonwords without primes. Priming was measured in terms of changes from the spelling patterns of nonwords by control children. Children with a reading age greater than 11 years showed the same level of facilitation as the adults in Campbell's 1983 study. Children below 11 years showed no significant priming. Significant intercorrelations were found between nonword spelling accuracy, reading age, priming

effect, and word spelling skill for the group as a whole. It was not clear that the younger children could spell the priming words, which may explain the lack of evidence for priming effects in the younger children.

Goswami (1988) endeavored to correct the problem with Campbell's study by ensuring the children could spell the priming word. Working with children in Grades 1 and 2, she followed the following design: a pretest of all words in the study plus distracter words; analogy sessions with clue word presented before asking the student to spell the target word (clue word on card present the whole time); and no-clue sessions where students spelled the words without a prime. Goswami found that the children spelled significantly more words correctly with the clue word in front of them and did so more often when the shared aspects of the words were in the rime than in the beginning of the word (although both were significant).

Nation and Hulme (1996), working with first graders, attempted to repair a few methodological problems with Goswami's 1988 study and extend her findings. In Experiment 1, they employed the following design: (a) a pretest on the test words; (b) an analogy condition with clue word read by the children or read to them; and (c) a condition of spelling the clue word, leaving the word in view, and spelling the analogous words. Nation and Hulme found significantly more words were spelled correctly after a clue word than at pretest. The priming effects were significant for various types of primes: CV (e.g., cord/corn), rime (e.g., born/corn), and vowel (e.g., lord/corn) but not for common letter (e.g., cone/corn). Children at all levels of spelling development showed the same results. Nation and Hulme explained that all the children could spell all the prime words.

In Experiment 2, the experimental group heard the related prime and then spelled the target words. The control group heard unrelated primes then spelled the target words. For example, with experimentally related prime (green) and unrelated control prime (horse), children from both groups spelled a CV nonword /grib/; vowel nonword /pim/, and rime nonword /trin/. The dependent measure was the number of times the critical spelling pattern was used. Nation and Hulme found that the young children used the critical pattern to spell more nonwords in primed condition than the control children did. They concluded that 6- and 7-year-old children can make analogies between words sharing letter-sound sequences and that young children can also make analogies when the clue words are not present. Nation and Hulme concluded that the lack of replication of Campbell's findings was due to fact the children in Campbell (1985) study could not spell the primes, and they controlled for that.

Nation and Hulme concluded that, while connectionist models (Adams, 1990; Seidenberg & McClelland, 1989) are of reading development, theoretically the same principles can be used when interpreting spelling development. Children's use of analogies may be viewed as a byproduct of PDP models. They generalize to new words because of the statistical relationships between sound patterns and spelling patterns encoded by the system. Children are able to make more analogies as they get older simply because they have had more experience with print and have more knowledge concerning the statistical relationships between sound and spelling.

Summary

The language-based priming literature provides a window into the processes involved in reading and spelling. There are robust priming effects due to morphological,

phonological, and orthographic similarities between the prime and the target word. The amount of overlap between the processing of the prime and the processing of the target seems to determine the priming effect. The priming paradigm has not been used in applied settings or with writing fluency and spelling accuracy. The present study extended the priming literature into the classroom and into a new method of measuring the effects of different types of priming information.

Research Methodology

The research on story starters focused on the stereotypic content of story starters (Trepanier-Street et al., 1990), planning interventions (Graves, Montague, & Wong, 1990), comparing types of pictures as prompts (Knudson, 1992), and story starter controls versus story endings (Isaacson & Mattoon, 1990). However, Knudson (1991) also examined the effects of different writing experiences on the composition of third, fourth, and fifth graders. She compared the following writing prompts: (a) a description of a picture, (b) a picture, (c) story starters, and (d) no topic. After 14 days of daily 20-minute writing periods, she found that none of the conditions had a differential effect on the compositional quality of the students while grade, reading ability, and writing occasion all were significant effects. Because each of the writing experiences took place in each participating teacher's classroom at the same time, there was no discussion of the topics or opportunity for instruction.

The "traditional" story starter is often used as a control condition. There is no indication in the literature of attempts to investigate whether the type of delivery of story starters will affect the writing fluency and accuracy of children's stories.

In a discussion of classroom-based assessments, Tindal and Marston (1990) referred to story starter prompts as directions to a writer to elicit writing. There are many types of prompts that can be used: pictures, topic sentences, story starters, incomplete sentences, and reading passages. Tindal and Marston concluded that it is important to match the prompt to the type of writing desired.

Contributors to Compositional Fluency

Mercer and Mercer (1998) stated that there is a significant correlation between compositional fluency and other measures of writing skills; however, not much is known about what contributes to compositional fluency and proficiency. The influence of handwriting fluency, reading achievement, and spelling achievement needs to be investigated in order to explain better what contributes to children's writing fluency and spelling accuracy as they compose connected text. In the following section, the relationship of handwriting fluency, spelling achievement, and reading achievement to compositional fluency and spelling accuracy is explained.

Handwriting Fluency and Spelling Achievement

Writing is a complex and demanding task. It is composed of many interacting and simultaneous tasks, all of which demand some of the writer's limited cognitive resources. These tasks can be thought of as lower-level tasks such as recollecting and forming letters, spelling words correctly, and spacing words in a sentence. At the same time, higher-level tasks such as planning, content generation, consideration of audience, and revising are also taking place. Berninger and her colleagues refer to the lower-level processes of handwriting and spelling as transcription skills and have contributed

considerably to our understanding of the importance of transcription skills to compositional fluency and quality (Berninger, 1999; Berninger et al., 2000).

Using structural equation modeling, Graham, Berninger, Abbott, Abbott, and Whitaker (1997) reported that handwriting speed accounted for 66% of the variance in children's written composing fluency and 25% of compositional quality of the primary age group in their sample. Even in the intermediate grades, handwriting explained 41% of the compositional quality. In fact, Graham et al. found that the contribution of transcription skills accounted for more variance than working memory did throughout elementary school. Thus, how well handwriting and spelling fluency are developed is the best predictor of the amount and quality of written composition in the elementary grades. Graham et al. (1997) also found that spelling achievement accounted for 41% of the variance in compositional fluency at the primary and intermediate grades and 42% of the compositional quality.

One possible reason for the effect of transcription skills on composition is that difficulty with handwriting can interfere with the upper-level tasks during the composing process (Graham, 1999). When lower-level processes such as writing letters from memory are not automatic, there may be insufficient processing available in the space- and time-limited working memory to allow for higher-level tasks such as planning, content generation, and revising. These higher-level tasks require significant processing resources and cannot become automatic (Berninger, 1999; McCutchen, 1988). This interference from the lower-level processes can lead to what McCutchen calls "retrieve-and-write" composition. This type of writing is seen in many young writer's compositions where they think of a series of sentences related to the topic and write each

down in order whether they continue the previous thought or not. The children do not use transitions and do not appear to consider their audience. The lower-level processes of writing and spelling are demanding too many of the limited cognitive resources, leading the child to conserve resources and reduce demands.

Graham and Weintraub (1996) explained the difficulties in composing experienced by slow writers: (a) slow rate of handwriting may not be fast enough to keep up with their thoughts, causing the child to forget what he was going to write or intended to write; (b) having to switch attention from content generation to the mechanical demands of writing may also cause the writer to forget already developed ideas; (c) simultaneously allocating attention to writing while also planning may interfere with planning processes, leading to less complex and incoherent content; and (d) handwriting difficulties may cause the child to feel negatively about writing because it is so laborious. Graham, Berninger, Weintraub, and Schafer (1998) echoed these sentiments while stating that difficulties in acquiring handwriting skills may lead children to avoid writing and develop an attitude that they cannot write, which could lead to writing deficiencies.

Berninger et al. (1997) concluded that handwriting exerts constraints on the text generation process in beginning writers. "The developmental origin of writing disabilities in the early grades when neurodevelopmental factors interfere with transcription processes and thus ability to translate generated text into written language" (p. 653). Explicit instruction in handwriting improved the handwriting and compositional fluency of first grade students. An interesting finding is that the children also improved in word recognition although it was not directly taught in the intervention.

Reading Achievement

Hammill and McNutt (1981) (cited in Mercer & Mercer, 1998) found that writing skills are among the best correlates of reading skills. Skills such as writing, spelling, punctuation, and capitalization are highly correlated to reading achievement. The previous section on the connection between spelling and reading leads to the conclusion that children's level of reading achievement may contribute significantly to their writing fluency and spelling accuracy.

Literature Review Summary

The literature reviewed in Chapter 2 provided an explanation of the connectionist theoretical framework for explaining the processes involved in reading and writing. Adams's (1990) parallel-distributed processing model of reading frames a reasonable theory of the cognitive processes in both reading and writing. Empirical evidence of the interconnected nature of reading and spelling lends support for the theorized connection (Ehri, 1991, 1995, 1997; Foorman et al., 1991; Moats, 1995; Nation & Hulme, 1996). Experimental evidence suggests that providing different types of priming information (i.e., semantic, morphological, orthographic, and phonological) before the processing of words leads to facilitated processing speed on a target task. The effect in reading and related activities is strong, especially for repetition, morphological, and phonological priming.

Although the clinical research on priming contributes to our understanding of its effects, the effects of different types of priming information on writing connected text in natural settings have not been established. To date, there is no research to investigate the effects priming conditions have on the production of connected text. The effect story

starters have on the writing of children also remains unclear. Research on the effects that story starters presented in various conditions (orthographic, phonological, and contextual) have on writing fluency and spelling accuracy may help determine whether facilitative effects seen in reading-related tasks can be seen in writing and spelling.

CHAPTER 3

METHODS AND MATERIALS

The purpose of this study was to examine Adams's connectionist model of reading (1990) and her contention that reading and spelling use the same processors, but in opposite directions (i.e., reading begins with orthographic input and spelling begins with phonological input). Specifically, the connections between the processors were tested by using story starters in varying priming conditions and then measuring the effects on the writing fluency and spelling accuracy of second-grade students.

Research Questions and Hypotheses

Story starters are little studied but widely used methods of eliciting writing from children. It is unclear what effects they have on the writing of children and which method of presentation of a story starter may facilitate the most fluent writing. It is possible that story starters may provide a priming condition for young children that facilitates their writing fluency and spelling accuracy. Thus, this study addressed the following primary research question: *What are the effects of priming on the compositional fluency and spelling accuracy of second-grade students?* It was hypothesized that the different story starter conditions would provide differential priming effects on the writing fluency and spelling accuracy of second-grade children.

Because of the large amount of variability in the writing abilities of young children, it may be that groups of children, defined by variables important to writing and classroom instruction, may experience the writing conditions differently. The processes

involved in facilitating writing fluency in young children also remain unclear as do the variables that contribute to the compositional fluency and spelling accuracy of young children writing in natural conditions. The resulting research questions and hypotheses are presented in Table 2.

Table 2
Ancillary Research Questions

Research Question
<i>Question 2:</i> What are the effects of priming on the compositional fluency and spelling accuracy of sub-groups of second-grade students based on quartiles of spelling, reading comprehension, and handwriting fluency?
<i>Question 3:</i> How do the compositional fluency and spelling accuracy of second-grade students differ by presence of a disability or giftedness, participation in Title 1, and gender?
<i>Question 4:</i> What proportion of the total variance in compositional fluency and spelling accuracy is due to the unique variance of handwriting fluency, reading comprehension and spelling achievement when all other variables are controlled?

Setting and Participants

The purpose of this section is to describe the instructional settings where the study took place and to provide a description of the participants. Demographic details are provided for both school sites and participants.

School Demographics

Four schools in one north central Florida district were selected for this study. The schools were selected to represent a distribution of both low- and middle-income

populations as well as culturally and linguistically diverse populations. The socioeconomic level of the schools is based on the percentage of students in the school receiving free or reduced-price lunch. The characteristics of each school are reported in Table 3.

Table 3
Descriptive Demographic Information for Participating Schools

School	Total Enrollment	Students with disabilities	Gifted	Speakers of ESL	Students who receive free or reduced-price lunch	Mobility Rate
1	404	12.1	7.2	0.9	83.9	34.3
2	466	12.4	3.4	6.2	86.9	65.6
3	706	11.2	9.5	0.7	49.4	33.6
4	568	14.9	2.7	0	57.2	23.6
District	13,601	15.6	10.3	1.5	56.2	6.6

Note. Data are reported in percentage of total enrollment in school year 2000-2001.

Participant Description

Three hundred fifty second-grade students in Alachua County, Florida, were sampled (see Appendix C for Institutional Review Board Approval). After removing students who did not complete all six stories, the group was reduced to 195. The demographic composition of this sample is in Table 4. The group included students with exceptionalities, students participating in Title 1 services, and speakers of English as a second language as they naturally occurred in the second grade classrooms. All second-grade students in the participating schools were invited to be a part of the study. Second-grade students were selected because they typically have acquired understanding of the

Table 4
Participant Demographic Information

		Writing Condition Sequence						
		Sample Total	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆
<i>Gender</i>								
	Male	95	20	19	13	17	14	12
	Female	100	18	16	16	19	15	16
<i>Ethnicity</i>								
	African American	66	7	10	20	12	11	6
	Asian	1	0	0	0	0	1	22
	Caucasian	113	28	23	6	19	15	0
	Hispanic	9	1	0	3	4	1	0
	Multiracial	5	2	2	0	0	1	0
<i>Lunch Status</i>								
	Free	89	13	15	22	16	16	7
	Reduced-price	13	3	2	1	2	3	2
	Full-price	93	22	18	6	18	10	19
<i>Title I</i>								
	Not enrolled	158	31	31	18	34	20	24
	Enrolled	37	7	4	11	2	9	4
<i>Free or Reduced Lunch and Title I</i>		33	7	4	11	1	7	6
<i>Special Education</i>								
	Not enrolled	143	19	28	22	31	22	21
	Learning Disabled	3	1	0	0	1	1	0
	Gifted	31	15	4	4	2	2	4
	Speech	14	2	2	3	2	3	2
	Language	3	1	0	0	0	1	1
	Behaviorally Disabled	1	0	1	0	0	0	0
<i>Total</i>		195	38	35	29	36	29	28

alphabetic principle in reading and writing, but are still developing their expertise. The processes by which they encode words are believed to be still developing and more amenable to observation than older students.

The participants were assigned to the sequence of writing conditions through random assignment of intact classroom groups by teacher. Each student wrote a story in each condition, but the sequence of the presentation was counterbalanced in a replicated Latin-square design to control for possible order effects.

Priming Conditions

The students were asked to write a story following each of six different story starters presented under different conditions. Each of the teachers presented each of the conditions to his or her class, thus a writing sample for each participant was collected for each story starter condition. Descriptions of the priming conditions are outlined in the following section (see Appendix D for teacher scripts).

Condition 1: Orthographic Priming

In Condition 1, a priming condition was designed to prime the connections from the orthographic to the phonographic processor through copying a story starter. The story starter was printed on a transparency and placed on an overhead projector. The teacher told the students they were going to write a story about the topic of the day and instructed the students to copy the story starter and then finish the story.

Condition 2: Phonological Priming

In Condition 2, the story starter was presented through dictation in order to prime the connections from the phonological to the orthographic processor. The teacher told the students they were going to write a story about the topic of the day and then read the

entire story starter one time to the students. The teacher then dictated it one word at a time as the students wrote it down. The students then were instructed to finish the story.

Condition 3: Contextual and Orthographic Priming

Condition 3 was designed to activate both the meaning processor and the connections from the orthographic to phonological processors. The teacher told the students they were going to write a story about the topic of the day and then discussed the story using a scripted format with the students. The teacher then placed a transparency of the story starter on the overhead and instructed the students to copy the story starter and finish the story.

Condition 4: Contextual and Phonological Priming

Condition 4 was designed to activate both the meaning processor and the connections from the phonological to orthographic processors. The teacher told the students they were going to write a story about the topic of the day and then discussed the story using a scripted format with the students. The teacher stated the entire story starter one time and dictated it one word at a time as the students wrote it down on their papers and finished the story.

Condition 5: Contextual Priming

In Condition 5, the meaning processor was activated through discussion prior to composition. The teacher told the students they were going to write a story about the topic of the day and then discussed the story using a scripted format with the students before instructing them to write the story.

Condition 6: No Priming

In Condition 6, no priming was provided. The teacher told the students they were going to write a story about the topic of the day and asked the students start writing. For example, if the story starter was about a bunny that decides he doesn't like being a bunny anymore, in this condition, the students were instructed to "write a story about a bunny rabbit that doesn't like being a bunny anymore."

Research Instrumentation

Participants were assessed on a variety of academic tasks in the context of a normal school day. These tasks were administered by classroom teachers in a whole-group setting. Both dependent measures and covariate measures were administered to determine the effects of the writing conditions on the production of connected text by the participants.

Dependent Variable Measures

The dependent measures assessed the writing fluency and spelling accuracy of the students after each story starter condition. These measures were determined by examining the written products of the participants. Descriptions of the assessment instruments are outlined in the following section.

Writing fluency

Each student produced a writing sample in each of the six conditions. The method of obtaining a writing sample was adapted from curriculum-based measurement procedures (Shinn, 1989) by taking two 3-minute samples and averaging them. In each condition, the teacher timed the students' writing for 6 minutes. After administering the story starter, the teacher said, "Get ready (and after determining that everyone was

ready), begin.” The teacher then set the timer for 3 minutes. When the timer beeped, the teacher instructed the students to “circle the word you are writing” and monitored compliance. Each teacher then set the timer for another 3 minutes and told the students to continue writing. At the end of the writing time, the teacher instructed the students to “put a circle around the word you are writing and finish your story.” The teacher made sure students had put a circle around the final word and allowed them to keep writing. When all the students were finished, the stories were collected and the class was praised for good effort during writing.

Story topics. Each teacher was given the story topic and directions for administering the story starter appropriate for the assigned condition before each occasion. The researcher explained all of the directions while modeling each presentation method. Teachers were given an opportunity to ask clarifying questions after reaching the scripts and hearing the explanation. The story topics were designed to elicit goal-based narratives on topics familiar to second-grade students. Story topics and instructions to teachers for each condition can be found in Appendix D. Each story topic was used in all of the conditions on each occasion for a total of six story topics necessary for the entire study.

The story starters were equalized as much as possible in the following ways. The topics are all familiar ones to second-grade students in Florida, and character names are easy to spell. The length of each starter was equalized to 15 words, and each ended in an incomplete sentence for the students to finish. The gender of the main character in each was alternated; three starters featured female characters and three featured males. The starters were piloted on second graders not included in this study and revised after

evaluating their response and ability to copy and write from dictation. In this way, 15 words were deemed an accessible number of words for low-achieving and slow-writing students.

Scoring writing fluency. The number of words in 3 and 6 minutes was counted for each writing sample. When a score for the second 3 minutes was available, the two scores were averaged to provide a fluency score. When a second score was unavailable, the score from the first 3 minutes was used. Fifty-seven percent of the writing samples of each teacher in each condition were randomly sampled and scored a second time by a trained scorer for an interrater reliability measure.

Reported reliability and validity. Marston (1989) reported the results of several reliability and validation studies on writing fluency. The test-retest coefficients range from .64 to .91 for total words written with coefficients for parallel forms ranging from .42 to .96 with most larger than .75. A split-half coefficient of .99 and Cronbach's alpha of .87 was also obtained for total words written. It was expected that the reliability of this measure would be higher in this study because of the increase in writing time. With a change from 3 minutes to 6, the writing sample would be longer and thus a more reliable measure of the writing fluency construct.

Concurrent validity has been established through high correlations with criterion measures of writing ability (Marston, 1989). The total number of words written in 3 minutes could reliably differentiate between groups of students with disabilities, those who participate in Title 1, and average achievers.

Spelling accuracy

The first 20 words of each writing sample were assessed for spelling accuracy. These were chosen because they are directly after the story starter, and it is believed they would show the most effect from the priming condition and fewer possible effects from the story writing. If a child did not write 20 words, all of the words were scored.

The words were scored on a scale of 0 to 5. Words were scored 5 if conventionally spelled, 4 if spelled phonetically correct, 3 if the initial phoneme and two other phonemes were represented in the correct order, 2 if the initial phoneme and one other was present, 1 if the initial phoneme was not represented but at least one other was represented correctly, and 0 if no phonemes were correctly represented. This total number of points was divided by the number of words evaluated to obtain an average per word accuracy score. Fifty-seven percent of the writing samples of each teacher in each condition were randomly sampled and scored a second time by a second trained scorer.

Covariate Measures

Covariate measures assessed spelling achievement, reading achievement, and handwriting fluency (see Appendix E for teacher scripts). These measures were obtained to provide additional sources of information about contributions to the writing fluency and spelling accuracy of young children.

Orthographic knowledge and spelling developmental stage

The orthographic knowledge and spelling development of each student was determined by the brief screening inventory of the *Developmental Spelling Analysis* (Ganske, 1999, 2000). The screening inventory identifies students' stage of orthographic development. The screening inventory was administered by dictating 20 words in sets of five that become progressively more difficult. Each set of words focuses on a different

developmental spelling stage (letter name, within-word pattern, syllable juncture, and derivational constancy). Each child was told to stop after missing three or more words in any one five-word set.

Scoring the screening inventory. The screening inventory of the DSA is scored by awarding one point for each word spelled correctly until the stopping point. No points are awarded after the child has reached the ceiling of three errors in a set. Fifty percent of the writing samples of each teacher in each condition were randomly sampled and scored a second time by a second trained scorer to provide a measure of interrater reliability.

Reported reliability and validity of DSA. Internal consistency reliability coefficients for on the screening inventory ranged from .88 to .91 ($n = 1016$; Ganske, 1999). Ganske also estimated the content, concurrent and predictive validity of the DSA. She found that the DSA identified the correct stage of development in children 90% of the time. In addition, teachers ($n = 58$) were surveyed about (a) the helpfulness of the measure, (b) ease of use, and (c) comparisons to other measures. The majority of the teachers (more than 86%) found the test helpful and easy to use.

Handwriting fluency

Handwriting fluency has been assessed by various researchers (Berninger et al., 1997; Graham, Berninger, Weintraub, & Schafer, 1998). Two tasks adapted from the previous studies were used in the present study. The students were provided with pencils without erasers and primary lined paper.

Both tasks were group-administered and timed for 60 seconds. In the first task, the students were asked to write the alphabet in lower case letters as quickly and neatly as

possible. The students were instructed to cross out any mistakes that they made. At the end of 60 seconds, the participants were instructed to stop and put down their pencils. In the second task, the students were given a page with a simple sentence printed in D'Nealian at the top and instructed to copy it as quickly and neatly as possible onto the lined paper below and, if they finished before the timer beeped, to copy the sentence again from the beginning. The following sentence was used because it contains the majority of the letters of the English alphabet. "The brown fox jumps over the lazy dog." At the end of 60 seconds, they were instructed to stop and put down their pencils.

The score for each handwriting task consisted of the number of correctly formed letters in 60 seconds. To be scored as a correct letter, it was lowercase (except T in "The"), recognizable out of context, and reasonably proportional and aligned with the three primary lines. Fifty percent of the writing samples of each teacher in each condition were randomly sampled and scored a second time by a trained scorer in order to obtain a measure of interrater reliability.

Reading achievement

The scale scores of the reading comprehension subtest from the district-wide standardized reading achievement test were used. The Stanford Achievement Test 9 is the test administered to the first and second grades in this district. The comprehension subtest consists of short narrative (recreational), expository (textual), and functional reading selections followed by multiple-choice questions about each selection. The questions consist of literal, inferential, and critical comprehension as well as reading strategy knowledge. The Stanford Achievement Test was normed in 2000 and has high

internal consistency and test-retest reliability. The students read the selections and then answer the questions. The test was administered March 12 through March 15, 2001.

Experimental Design

Each teacher administered each writing condition to each student in his or her class, leading to a replicated Latin-square design. This design maximizes statistical power by controlling for variance due to individuals, sequence of conditions, and occasions (Myers & Well, 1995). The order of presentation was counterbalanced to control for possible order effects. In addition, in order to control for possible effects due to story topic, on each occasion all of the conditions used the same topic. For example, on Occasion 1, all of the conditions involved the same story starter about a squirrel named Sammy. On Occasion 2, all of the conditions had story starters about a girl named Kim. This continued throughout all of the occasions.

Because more than one subject is included at each level of intervention, a six-by-six replicated Latin-square design was used (Myers & Well, 1995). The basic distinguishing characteristic of a Latin-square design is that each treatment level appears in each column and row exactly once. First, a random member of the set of the possible squares was constructed by starting with a standard square and then randomly permuting the rows, the columns, and finally all the letters (Myers & Well, 1995). The resulting square was then replicated 195 times. The teachers were randomly assigned to each treatment sequence, but students were not due to classroom constraints. The resulting design can be found in Table 5.

Table 5
Replicated Latin Squares Design

Seq.	Teachers	Particip.	Occ. 1	Occ. 2	Occ. 3	Occ. 4	Occ. 5	Occ. 6
S ₁	31	N = 38	A ₂	A ₃	A ₅	A ₆	A ₄	A ₁
	42							
	48							
S ₂	35	N = 35	A ₄	A ₆	A ₃	A ₅	A ₁	A ₂
	41							
	47							
S ₃	11	N = 29	A ₆	A ₁	A ₄	A ₂	A ₅	A ₃
	21							
	44							
S ₄	22	N = 36	A ₁	A ₅	A ₆	A ₃	A ₂	A ₄
	32							
	46							
S ₅	23	N = 29	A ₃	A ₄	A ₂	A ₁	A ₆	A ₅
	33							
	43							
S ₆	24	N = 28	A ₅	A ₂	A ₁	A ₄	A ₃	A ₆
	34							
	45							

In addition to the writing sample data collection, each participant was assessed on measures related to writing fluency and spelling accuracy. These measures were group administered during the same period the writing samples were obtained.

Treatment of the Data

Word writing fluency and spelling accuracy data were collected on each of six stories written under six story starter conditions. In addition, data on measures related to writing fluency and spelling accuracy were collected: letter-generating fluency, sentence-copying fluency, spelling achievement, and reading achievement.

To examine the effects of writing condition on the writing fluency and spelling accuracy of the second-grade students, a replicated Latin-square analysis of variance and follow-up procedures were conducted. A series of replicated Latin-square analyses were also conducted on subgroups of the sample defined by measures related to compositional fluency and follow-up procedures were used to further evaluate differences found.

In addition, the responses of students defined by variables important to classroom instruction and program planning (i.e., presence of a disability or giftedness, gender, enrollment in Title 1, and socio-economic status) were compared in a repeated-measures analysis of variance to determine group mean differences in writing fluency and spelling accuracy in each condition. Finally, multiple regression was used to determine which measures explain the variance in writing fluency and spelling accuracy. The null hypotheses for the research questions are listed in Table 6.

Table 6
Analyses of the Data

Null Hypothesis One: There will be no statistically significant differences due to condition, occasion, or sequence on a measure of writing fluency among students in the whole sample or in subgroups.

Null Hypothesis Two: There will be no statistically significant differences due to condition, occasion, or sequence on a measure of spelling accuracy among students in the whole sample or in subgroups.

Null Hypothesis Three: There will be no statistically significant difference between groups on measures of writing fluency and spelling accuracy.

Null Hypothesis Four: The unique variance of handwriting fluency, reading achievement, spelling achievement, and priming conditions will not contribute significantly to the total variance of writing fluency.

Null Hypothesis Five: The unique variance of handwriting fluency, reading achievement, spelling achievement, and priming conditions will not contribute significantly to the total variance of spelling accuracy.

CHAPTER 4

RESULTS

The purpose of this study was to examine Adams's (1990) connectionist model of reading and her contention that reading and spelling use the same processors, but in opposite directions (i.e., reading begins with orthographic input and spelling begins with phonological input). Specifically, the connections between the processors were tested by using story starters in varying priming conditions and then measuring the effects on the writing fluency and spelling accuracy of second-grade students. The following research questions were asked:

- (1) What are the effects of priming on the compositional fluency and spelling accuracy of second-grade students?
- (2) What are the effects of priming on the compositional fluency and spelling accuracy of subgroups of second-grade students?
- (3) How do the compositional fluency and spelling accuracy of second-grade students differ by presence of a disability or giftedness, participation in Title 1, and gender?
- (4) What proportion of the total variance in compositional fluency and spelling accuracy is due to the unique variance of handwriting fluency, reading comprehension and spelling achievement when all other variables are controlled?

To answer these research questions, the writing fluency and spelling accuracy of six stories written under six conditions by 195 second-grade students were analyzed. In addition, data were analyzed related to constructs believed related to writing achievement: letter-generating and letter-copying fluency, spelling achievement, and reading comprehension achievement.

This chapter provides the results of the statistical analysis of the data from this study. The following results will be reported: (a) obtained reliability coefficients for measures used, (b) replicated Latin-square analysis of variance for compositional fluency and spelling accuracy, (c) mixed analysis of variance with repeated measures comparisons of group responses for compositional fluency and spelling accuracy, (d) multiple regression analysis of compositional fluency and spelling accuracy.

Data Analysis

Obtained Reliability Coefficients

Fifty-seven percent of the responses on each measure (i.e., compositional fluency, spelling accuracy, handwriting fluency, and spelling achievement) were randomly selected from each teacher's class and scored a second time by a trained scorer. The resulting interrater reliability coefficients for compositional fluency are .993, $n = 122$ for the first 3-minute sample and .996, $n = 122$ for the second. The interrater reliability coefficient for spelling accuracy was .916, $n = 116$. The reliability coefficient obtained for the *Developmental Spelling Analysis* (Ganske, 1999) was .973, $n = 113$; for the letters handwriting fluency, .973, $n = 112$; and for copied words, .939, $n = 111$.

In addition, the word count scores for the first- and second-3 minute samples were compared in a split-half reliability analysis. The Spearman-Brown reliability coefficient was .769. Because the 3-minute samples were deemed reliable, the average of the two was used in the following analyses when the second 3-minute score was available. When unavailable, the first 3-minute sample was used.

Effect of Writing Conditions on Compositional Fluency and Spelling

The average 3-minute compositional fluency and spelling accuracy scores were compared using a replicated Latin-square analysis of variance (ANOVA). The descriptive data for compositional fluency is reported in Table 7 and in Table 8 for spelling accuracy. The 6 X 6 replicated Latin-square analysis was used to evaluate group means of both compositional fluency and spelling accuracy using two 6 (occasion) X 6 (condition) X 6 (sequence) mixed analyses of variance with repeated measures with each of condition and occasion as the within-subjects factors and sequence as the between-subjects factor. The two source tables were combined into one (Meyers & Well, 1995).

Effect on Compositional Fluency

The ANOVA source table for average compositional fluency is reported in Table 9. The group means of condition ($F = 8.662, 4.93, 932.3$), occasion ($F = 13.706, 4.77, 932.3$), and sequence of conditions ($F = 4.16, 5, 189$) were found to be significantly different at $\alpha = .05$.

Effects due to writing condition

Paired-sample t tests were used to evaluate differences among writing conditions (see Table 10). The Bonferroni adjustment was used to conserve the family-wise Type I error rate. Accordingly, an alpha level of .003 was used to determine significance. The mean for the context condition was significantly higher than the means of the orthographic condition, $t(194) = 4.84, p = .000$; context-orthographic condition, $t(194) = 4.74, p = .000$; and the context-phonological condition, $t(194) = 3.05, p = .003$. The mean compositional fluency of the topic condition was not significantly different from

Table 7
Descriptive Statistics for Compositional Fluency by Conditions

	Seq. 1	Seq. 2	Seq. 3	Seq. 4	Seq. 5	Seq. 6	Total
<i>N</i>	38	33	29	34	29	28	191
Orthographic (1)							
Minimum	4.0	4	10.5	0	6.5	10	0
Maximum	68.5	47	39	40.5	42	50.5	68.5
Mean	28.08	23.27	23.53	17.42	26.12	28.45	24.33
Standard Deviation	15.66	9.21	7.38	10.38	9.08	9.84	11.35
Phonological (2)							
Minimum	1.0	5	4	0	12.5	13	0
Maximum	47.50	49.5	48.5	100	51.0	45.5	100
Mean	21.64	23.83	23.13	30.11	31.34	29.21	26.33
Standard Deviation	11.19	10.49	11.60	18.11	10.02	9.34	12.76
Context-Ortho. (3)							
Minimum	5.5	3	5.5	2.5	12	9.5	2.5
Maximum	53.0	55.5	49	43	52	51	55.5
Mean	22.05	21.64	27.77	18.76	30.90	28.48	24.48
Standard Deviation	10.87	10.64	11.21	9.92	10.44	9.88	11.24
Context-Phono. (4)							
Minimum	1	4.5	4	2	6.5	10.5	1
Maximum	87.5	33	43	47.5	51.5	53	87.5
Mean	28.57	19.50	20.45	24.04	29.38	30.14	25.22
Standard Deviation	14.18	6.83	12.24	10.43	11.61	11.96	12.05
Context (5)							
Minimum	11	3.5	6.5	9.5	8.5	13.5	3.5
Maximum	55.5	48	56.5	49	53	61.5	61.5
Mean	28.59	23.94	29.03	25.10	30.02	30.86	27.72
Standard Deviation	8.48	11.04	12.53	10.00	10.80	9.69	10.60
Topic (6)							
Minimum	7.5	5.5	8	12	7.5	8	5.5
Maximum	57.5	39.5	49.5	49	57	51.5	57.5
Mean	26.99	22.93	24.83	26.18	38.06	28.05	27.57
Standard Deviation	10.88	9.36	9.90	10.82	12.52	10.91	11.58

Table 8
Descriptive Statistics for Average Spelling Accuracy by Conditions

	Seq. 1	Seq. 2	Seq. 3	Seq. 4	Seq. 5	Seq. 6	Total
<i>N</i>	36	34	29	29	29	28	185
Orthographic (1)							
Mean	4.82	4.74	4.79	4.87	4.68	4.73	4.77
Standard Deviation	.16	.49	.18	.14	.48	.21	.32
Phonological (2)							
Mean	4.85	4.63	4.71	4.83	4.68	4.77	4.74
Standard Deviation	.29	.54	.21	.17	.23	.18	.32
Context-Ortho. (3)							
Mean	4.84	4.66	4.70	4.79	4.71	4.72	4.74
Standard Deviation	.19	.43	.29	.23	.36	.24	.30
Context-Phono. (4)							
Mean	4.84	4.66	4.68	4.81	4.64	4.72	4.73
Standard Deviation	.23	.37	.31	.19	.35	.24	.30
Context (5)							
Mean	4.81	4.69	4.75	4.84	4.71	4.70	4.75
Standard Deviation	.24	.45	.29	.13	.39	.28	.32
Topic (6)							
Mean	4.83	4.76	4.70	4.83	4.75	4.77	4.78
Standard Deviation	.24	.38	.18	.14	.21	.23	.25

Note. Average spelling accuracy on a scale of 0 to 5.

Table 9
Latin Square Analysis of Variance for Compositional Fluency

Source	<i>df</i>	Type III <i>SS</i>	<i>MS</i>	<i>F</i>	η^2	<i>P</i>
Between Subjects						
Sequence	5	9998.39	1999.68	4.16	.099	.001
Within Cell Residuals	189	90857.66	480.73			
Within Subjects						
Occasion	4.77	3504.88	734.54	13.71	.068	.000
Condition	4.93	2215.07	449.06	8.66	.044	.000
Within Cell Residuals	932.27	48330.80	51.84			
Total	1135.97	154907.53	3715.85			

the context condition mean, $t(194) = .086, p = .932$; however, it was significantly higher than the means of the orthographic condition, $t(194) = 4.31, p = .000$; context-orthographic condition, $t(194) = 4.73, p = .000$; and context-phonological, $t(194) = 3.14, p = .002$. In order from most to least mean compositional fluency, the conditions are: context ($M = 27.73$), topic ($M = 27.67$), phonological ($M = 26.39$), context-phonological ($M = 25.24$), context-orthographic ($M = 24.45$), and orthographic ($M = 24.35$). No significant differences were found among context, topic, or phonological conditions (see Table 10).

Effects due to writing occasion

The writing occasions were also compared using paired-samples t tests (see Table 11). The mean for writing occasion six was significantly higher than the means for occasion four, $t(194) = 2.99, p = .003$ and occasion one, $t(194) = 3.66, p = .000$.

Table 10
Paired-Samples Comparisons for Condition

Group I	Group J	Mean Diff. (I-J)	Std. Error	p
Orthographic	Orthographic			
	Phonological	-2.05	.865	.019
	Context-Orthographic	-.11	.713	.877
	Context-Phonological	-.91	.767	.238
	Context	-3.40*	.702	.000
	Topic	-3.39*	.775	.000
Phonological	Phonological			
	Context-Orthographic	1.94	.768	.012
	Context-Phonological	1.14	.900	.206
	Context	-1.35	.779	.085
	Topic	-1.29	.777	.099
Context-Orthographic	Context-Orthographic			
	Context-Phonological	-.79	.854	.352
	Context	-3.29*	.694	.000
	Topic	-3.23*	.682	.000
Context-Phonological	Context-Phonological			
	Context	-2.49*	.816	.003
	Topic	-2.43*	.775	.002
Context	Context			
	Topic	.05	.687	.932
Topic	Topic			

Note. N= 195

*The mean difference is significant at $p < .003$ (two-tailed)

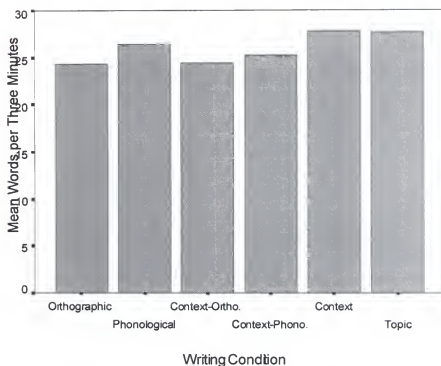


Figure 2. Mean compositional fluency in words per 3 minutes of second-grade students for orthographic, phonological, context-orthographic, context-phonological, context, and topic writing conditions ($N = 195$).

mean for occasion five was significantly higher than the means for all other occasions: six, $t(194) = 3.29, p = .001$; four, $t(194) = 5.41, p = .000$; three, $t(194) = 4.02, p = .000$; two, $t(194) = 5.24, p = .000$; and one, $t(194) = 6.67, p = .000$. In order from greatest to smallest compositional fluency, the writing occasions are five ($M = 29.30$), six ($M = 26.75$), three ($M = 26.07$), two ($M = 25.11$), four ($M = 24.71$), and one ($M = 23.74$) as reported in Table 11.

Effects on Compositional Fluency of Subsamples of Students

Because of the large variability in the student fluency responses to the writing conditions, the sample was divided into groups based on (a) quartiles of the Reading

Table 11
Paired-Samples Comparisons for Writing Occasion

Group I	Group J	Mean Diff.		<i>p</i>
		(I-J)	Standard Error	
Occasion 1	Occasion 1			
	Occasion 2	-1.37	.648	.035
	Occasion 3	-2.34	.816	.005
	Occasion 4	-.97	.763	.206
	Occasion 5	-5.65*	.859	.000
	Occasion 6	-3.06*	.835	.000
Occasion 2	Occasion 2			
	Occasion 3	-.96	.645	.137
	Occasion 4	.40	.700	.563
	Occasion 5	-4.27*	.815	.000
	Occasion 6	-1.68	.694	.016
Occasion 3	Occasion 3			
	Occasion 4	1.37	.692	.049
	Occasion 5	-3.31*	.842	.000
	Occasion 6	-.72	.736	.331
Occasion 4	Occasion 4			
	Occasion 5	-4.68*	.865	.000
	Occasion 6	-2.09*	.699	.003
Occasion 5	Occasion 5			
	Occasion 6	2.59*	.789	.001
Occasion 6	Occasion 6			

Note. *N* = 195

*The mean difference is significant at $p < .003$ (two-tailed)

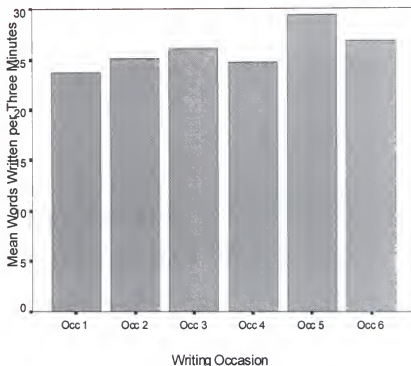


Figure 3. Mean compositional fluency in words per 3 minutes of second-grade students for writing occasions ($N = 195$).

Comprehension subtest scores of the *Stanford 9 Achievement Test*, (b) quartiles of number of letters generated in one-minute, and (c) quartiles of spelling achievement.

Reading comprehension quartiles

The reading comprehension measure was chosen as representative of general language-based academic achievement. The demographic information for the quartiles is presented in Table 12. Because three students did not have scores from the previous year, the total sample analyzed was 192.

An analysis of variance with repeated measures was conducted on the compositional fluency scores of the students in the first quartile. The condition factor had a medium effect ($\eta^2 = .11$) between writing conditions, $F(5,235) = 5.79, p = .000$. Paired-sample t tests were used to evaluate differences among writing conditions (see

Table 12
Participant Demographic Information by Quartiles of Reading Comprehension Scores

	Quartile 1	Quartile 2	Quartile 3	Quartile 4
<i>Gender</i>				
Male	23	21	19	28
Female	25	27	23	26
<i>Ethnicity</i>				
African American	31	20	8	7
Asian	0	0	1	0
Caucasian	14	23	30	44
Hispanic	1	4	2	1
Multiracial	2	1	0	2
<i>Lunch Status</i>				
Free	36	23	15	14
Reduced-price	5	4	3	1
Full-price	7	21	24	39
<i>Title 1</i>				
Not enrolled	21	42	39	53
Enrolled	27	6	3	1
<i>Special Education</i>				
Not enrolled	37	44	36	24
Learning Disabled	2	0	1	0
Gifted	0	2	4	25
Speech	5	2	1	5
Language	3	0	0	0
Behaviorally Disabled	1	0	0	0
<i>ESL Enrollment</i>				
Not enrolled	48	47	42	54
Enrolled	0	1	0	0
<i>Total</i>	48	48	42	54

Note. Number of students per group. $N = 192$.

Table 13
Mean Compositional Fluency of Reading Comprehension Quartiles

	Quartile 1 (<i>n</i> = 48)		Quartile 2 (<i>n</i> = 48)		Quartile 3 (<i>n</i> = 42)		Quartile 4 (<i>n</i> = 54)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Orthographic	20.30 ^a	9.46	22.69 ^a	9.31	24.99 ^a	9.43	29.56 ^a	13.67
Phonological	26.20 ^b	11.69	24.93 ^{ab}	11.96	27.17 ^a	15.94	27.57 ^a	11.94
Context- Orthographic	22.48 ^{ab}	11.03	23.90 ^{ab}	10.35	24.75 ^a	12.31	26.80 ^a	11.34
Context- Phonological	22.82 ^{ab}	11.85	23.31 ^{ab}	10.63	26.04 ^a	11.96	29.00 ^a	13.02
Context	27.31 ^b	13.00	27.54 ^b	10.67	26.82 ^a	8.31	29.30 ^a	10.06
Topic	26.04 ^b	11.84	26.80 ^{ab}	10.74	28.02 ^a	11.79	29.81 ^a	11.82

Note. Means in the same column followed by different letters are significantly different at $p < .003$. Average number of words written in 3 minutes. $N = 192$.

Table 13). The Bonferroni adjustment was used to conserve the family-wise Type I error rate. Accordingly, an alpha level of .003 was used to determine significance. For students with the lowest reading achievement, the mean compositional fluency under the orthographic condition was significantly lower than the phonological, $t(47) = -4.07, p = .000$; context, $t(47) = -4.28, p = .000$; and topic conditions, $t(47) = -3.68, p = .001$. No other significant mean differences were found among the writing conditions (see Table 13).

The same procedure was conducted for the students in the second quartile of the reading comprehension scores. An ANOVA with repeated measures was conducted and the writing condition factor was found to have a medium ($\eta^2 = .07$) effect on the mean compositional fluency, $F(5,235) = 3.30, p = .007$. Follow-up procedures found significant

mean differences between the orthographic and context conditions, with students writing significantly more in the context condition, $t(47) = 3.90, p = .000$. No significant mean differences were found among the other conditions (Table 13). For students in the third, $F(3.76, 154.31) = 1.05, p = .383$ and fourth quartiles, $F(4.06, 215) = 1.52, p = .196$, no significant mean differences were found among writing conditions.

Writing fluency quartiles

Effects of the writing conditions were evaluated for students who varied in writing fluency. The students were divided into quartiles based on the number of letters generated in one minute. The demographic information for the quartiles is presented in Table 14. Because seven students did not participate in the letter-generation measure, the total sample analyzed was 188.

An analysis of variance with repeated measures was conducted on the compositional fluency scores of the students in the first quartile. The condition factor had a medium effect ($\eta^2 = .09$) between writing conditions, $F(4.44, 204.28) = 4.54, p = .001$. Paired-sample t tests were used to evaluate differences among writing conditions (see Table 15). The Bonferroni adjustment was used to conserve the family-wise Type I error rate. Accordingly, an alpha level of .003 was used to determine significance. For students who wrote the slowest, the mean compositional fluency under the context-orthographic condition was significantly lower than the phonological, $t(46) = -4.41, p = .001$; context-phonological, $t(46) = -4.78, p = .001$; context, $t(46) = -5.14, p = .000$; and topic conditions, $t(46) = -4.98, p = .000$. No other significant mean differences were found among the writing conditions (see Table 15).

Table 14
Participant Demographic Information by Quartiles of Writing Fluency Scores

	Quartile 1	Quartile 2	Quartile 3	Quartile 4
<i>Gender</i>				
Male	24	23	17	24
Female	23	27	27	23
<i>Ethnicity</i>				
African American	15	13	14	18
Asian	0	1	0	0
Caucasian	26	30	27	29
Hispanic	2	5	2	0
Multiracial	3	1	1	0
<i>Lunch Status</i>				
Free	22	25	17	22
Reduced-price	4	1	2	5
Full-price	21	24	25	20
<i>Title I</i>				
Not enrolled	35	43	35	41
Enrolled	12	7	9	6
<i>Special Education</i>				
Not enrolled	36	41	28	31
Learning Disabled	1	1	1	0
Gifted	4	5	11	11
Speech	3	3	4	4
Language	2	0	0	1
Behaviorally Disabled	1	0	0	0
<i>ESL Enrollment</i>				
Not enrolled	46	48	44	47
Enrolled	1	2	0	0
<i>Total</i>	47	50	44	47

Note. Number of students per group. $N = 188$.

Table 15
Mean Compositional Fluency of Letter-generation Quartiles

	Quartile 1 (<i>n</i> = 47)		Quartile 2 (<i>n</i> = 50)		Quartile 3 (<i>n</i> = 44)		Quartile 4 (<i>n</i> = 47)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Orthographic	21.22 ^{ab}	9.99	22.17 ^a	10.42	28.32 ^a	14.40	26.16 ^a	9.65
Phonological	23.00 ^a	11.28	25.20 ^a	14.78	29.73 ^a	11.42	28.28 ^{ab}	12.26
Context- Orthographic	18.59 ^b	9.19	23.48 ^a	11.36	27.64 ^a	11.77	28.61 ^{ab}	10.72
Context- Phonological	23.36 ^a	10.40	22.70 ^a	10.94	29.63 ^a	13.53	26.03 ^{ab}	12.73
Context	23.72 ^a	8.71	25.39 ^a	9.62	31.19 ^a	9.63	30.52 ^b	12.28
Topic	23.56 ^a	9.84	25.04 ^a	10.63	31.81 ^a	12.06	30.38 ^b	11.51

Note. Means in the same column followed by different letters are significantly different at $p < .003$. Average number of words written in 3 minutes. $N = 188$.

For students in the second, $F(4.42, 216.83) = 1.54, p = .186$ and third quartiles of writing fluency, $F(5, 215) = 1.48, p = .199$, no significant mean differences were found among conditions (Table 15). Among students with the highest writing fluency, significant mean differences with a medium effect ($\eta^2 = .07$) were found in the condition factor, $F(4.08, 188.05) = 3.36, p = .010$. After paired-samples t tests were conducted, the mean compositional fluency in the orthographic condition was found to be significantly lower than that of the context, $t(46) = -4.36, p = .002$ and the topic conditions, $t(46) = -3.03, p = .003$ (Table 15).

Spelling achievement quartiles

Effects of the writing conditions were evaluated for students who varied in spelling achievement. The students were divided into quartiles based on their score on

the *Developmental Spelling Analysis* (Ganske, 1999, 2000). The demographic information for the quartiles is presented in Table 16. Because eight students did not participate in the letter-generation measure, the total sample analyzed was 187. An analysis of variance with repeated measures was conducted on the compositional fluency scores of the students in the first quartile of spelling achievement. The condition factor had a medium effect ($\eta^2 = .09$) between writing conditions, $F(5, 255) = 4.78, p = .000$. Paired-sample t tests were used to evaluate differences among writing conditions (see Table 17). The Bonferroni adjustment was used to conserve the family-wise Type I error rate. Accordingly, an alpha level of .003 was used to determine significance. For students who had the lowest spelling achievement, the mean compositional fluency under the topic condition was significantly higher than in the orthographic, $t(51) = 5.02, p = .002$ and context-orthographic conditions, $t(51) = 4.57, p = .003$. The mean difference between the phonological and orthographic conditions approached significance, $t(51) = 4.62, p = .004$. No other significant mean differences were found among the writing conditions (see Table 17).

For students in the second, $F(5, 165) = 1.97, p = .086$ and third quartiles of spelling achievement, $F(5, 225) = 2.23, p = .053$, no significant mean differences were found among conditions (Table 17). Among students with the highest spelling achievement, significant mean differences with a medium effect ($\eta^2 = .06$) were found in the condition factor, $F(3.89, 210.26) = 3.15, p = .016$. After paired-samples t tests were conducted, the context condition produced significantly higher compositional fluency than in either the phonological, $t(54) = 3.73, p = .002$ or the context-orthographic conditions, $t(54) = 3.97, p = .001$ (Table 17). The topic condition had a

Table 16
Participant Demographic Information by Quartiles of Spelling Achievement

		Quartile 1	Quartile 2	Quartile 3	Quartile 4
<i>Gender</i>					
	Male	23	16	21	29
	Female	29	18	25	26
<i>Ethnicity</i>					
	African American	22	12	12	14
	Asian	0	0	0	1
	Caucasian	26	20	31	35
	Hispanic	1	2	3	2
	Multiracial	3	0	0	2
<i>Lunch Status</i>					
	Free	30	20	16	18
	Reduced-price	4	2	3	3
	Full-price	18	20	27	34
<i>Title I</i>					
	Not enrolled	30	29	42	53
	Enrolled	22	1	4	1
<i>Special Education</i>					
	Not enrolled	41	30	36	29
	Learning Disabled	2	0	1	0
	Gifted	0	3	5	23
	Speech	7	0	3	3
	Language	1	1	1	0
	Behaviorally Disabled	1	0	0	0
<i>ESL Enrollment</i>					
	Not enrolled	52	34	44	54
	Enrolled	0	0	2	1
<i>Total</i>		52	34	46	55

Note. Number of students per group. $N = 187$.

Table 17
Mean Compositional Fluency of Letter-generation Quartiles

	Quartile 1 (<i>n</i> = 52)		Quartile 2 (<i>n</i> = 34)		Quartile 3 (<i>n</i> = 46)		Quartile 4 (<i>n</i> = 55)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Orthographic	19.79 ^{abc}	9.18	22.43 ^a	8.51	24.48 ^a	10.90	29.69 ^{abc}	13.58
Phonological	24.40 ^{bc}	12.29	26.06 ^a	11.35	28.33 ^a	15.02	26.37 ^{ac}	12.56
Context- Orthographic	20.24 ^{ab}	10.68	24.87 ^a	7.97	25.74 ^a	11.92	26.12 ^a	11.83
Context- Phonological	20.75 ^{abc}	10.48	24.60 ^a	11.27	27.28 ^a	9.78	28.19 ^{abc}	14.45
Context	23.51 ^{abc}	10.45	26.50 ^a	9.84	29.17 ^a	9.67	30.09 ^{bc}	10.81
Topic	24.81 ^{bc}	11.96	27.29 ^a	10.15	27.95 ^a	10.91	30.10 ^c	12.51

Note. Means in the same column followed by different letters are significantly different at $p < .003$. Average number of words written in 3 minutes. $N = 187$.

significantly higher mean compositional fluency than the context-orthographic condition, $t(54) = 3.98$, $p = .000$. No other significant mean differences were found (Table 17).

Effect on Spelling Accuracy

The average spelling accuracy was compared using a replicated Latin-square ANOVA. Because some of the students did not write compositions in the time allotted (i.e., they wrote the starter but did not complete the story), 10 students were dropped from this analysis due to lack of spelling accuracy scores, changing the sample number to 185. In general, the students were accurate spellers. When averaged across all conditions, the students conventionally spelled 88% of the words analyzed. When considering words either spelled conventionally or phonologically correct, the percentage rises to 94%.

The results for spelling accuracy are reported in Table 18. The group mean differences due to condition ($F = 2.24, 4.91, 879.34, p = .050$) were found to be significantly different at $\alpha = .05$ and group mean differences due to occasion approached significance ($F = 1.813, 4.88, 873, p = .051$).

Effects Due to Writing Condition

Paired-sample t tests were used to evaluate differences among writing conditions on average compositional spelling accuracy (see Table 19). The Bonferroni adjustment was used to conserve the family-wise Type I error rate. Accordingly, an alpha level of .003 was used. No significant differences among conditions were found.

Table 18
Latin Square Analysis of Variance for Spelling Accuracy

Source	<i>df</i>	Type III <i>SS</i>	<i>MS</i>	<i>F</i>	η^2	<i>p</i>
Between Subjects						
Sequence	5	4.10	.820	2.26	.059	.051
Error	179	65.08	.364			
Within Subjects						
Occasion	4.88	.302	.062	1.81	.010	.110
Condition	4.91	.373	.076	2.24	.012	.050
Error (condition)	879.34	29.76	.039			
Total	1073.13	99.52	1.36			

Table 19
Paired-Samples Comparisons of Average Spelling Accuracy for Condition

Group I	Group J	Mean Diff. (I-J)	Std. Error	<i>p</i>
Orthographic	Orthographic			
	Phonological	.029	.019	.129
	Context-Orthographic	.036	.016	.032
	Context-Phonological	.046	.020	.025
	Context	.025	.019	.189
	Topic	-.004	.017	.820
Phonological	Phonological			
	Context-Orthographic	.006	.098	.743
	Context-Phonological	.017	.019	.384
	Context	-.004	.021	.850
	Topic	-.033	.073	.057
Context-Orthographic	Context-Orthographic			
	Context-Phonological	.014	.021	.619
	Context	-.010	.020	.606
	Topic	-.040	.017	.021
Context-Phonological	Context-Phonological			
	Context	-.208	.020	.300
	Topic	-.050	.075	.005
Context	Context			
	Topic	.025	.019	.189
Topic	Topic			

Note. N= 195

Effects on Compositional Spelling Accuracy of Subsamples of Students

Because of an interest in spelling accuracy responses to the writing conditions among students who vary in reading and spelling achievement as well as writing fluency, the sample was divided into groups based on (a) quartiles of the reading comprehension subtest scores of the *Stanford 9 Achievement Test*, (b) quartiles of number of letters generated in one-minute, and (c) quartiles of spelling achievement.

Reading comprehension quartiles

The reading comprehension measure was chosen as representative of general language-based academic achievement. Because two students did not have scores from the previous year, the total sample analyzed was 183.

An analysis of variance with repeated measures was conducted on the compositional spelling accuracy scores of the students. There were no significant mean differences in compositional spelling accuracy among students in the first, $F(4.58, 201.71) = .358, p = .862$; second, $F(5, 225) = 1.23, p = .295$; third, $F(5, 200) = 1.10, p = .362$; or fourth, $F(5, 250) = .818, p = .538$ quartiles of reading comprehension achievement (see Table 20).

Writing fluency quartiles

Effects of the writing conditions on spelling accuracy were evaluated for students who varied in writing fluency. The students were divided into quartiles based on the number of letters generated in one minute. Because six students did not participate in the letter-generation measure, the total sample analyzed was 179.

Table 20
Mean Compositional Spelling Accuracy of Writing Fluency Quartiles.

	Quartile 1 (<i>n</i> = 45)		Quartile 2 (<i>n</i> = 46)		Quartile 3 (<i>n</i> = 41)		Quartile 4 (<i>n</i> = 51)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Orthographic	4.61 ^a	.557	4.77 ^a	.165	4.81 ^a	.168	4.89 ^a	.120
Phonological	4.58 ^a	.502	4.73 ^a	.220	4.77 ^a	.208	4.88 ^a	.139
Context- Orthographic	4.58 ^a	.445	4.72 ^a	.285	4.78 ^a	.167	4.85 ^a	.163
Context- Phonological	4.57 ^a	.399	4.72 ^a	.235	4.76 ^a	.248	4.86 ^a	.189
Context	4.57 ^a	.466	4.75 ^a	.235	4.81 ^a	.242	4.85 ^a	.196
Topic	4.62 ^a	.360	4.79 ^a	.164	4.83 ^a	.199	4.86 ^a	.159

Note. Means in the same column followed by different letters are significantly different at $p < .003$. Average number of words written in 3 minutes. $N = 183$.

An analysis of variance with repeated measures was conducted on the compositional fluency scores of the students in the first quartile. There were no significant mean differences in the condition factor, $F(4.49, 197.57) = .771, p = .559$ (see Table 21).

For students in the second quartile, there were significant mean differences due to condition with a medium effect ($\eta^2 = .07$), $F(4.27, 187.80) = 3.38, p = .009$. Follow-up procedures found that students spelled significantly more accurately in the context-phonological condition than in the orthographic, $t(44) = 3.84, p = .000$. The difference between the context-orthographic and orthographic conditions approached significance, $t(44) = 3.06, p = .004$. No other significant differences were found (Table 21). Among students in the third, $F(4.34, 191.23) = .79, p = .542$ and fourth, $F(5.215) = .85, p = .514$

Table 21
Mean Compositional Spelling Accuracy of Writing Fluency Quartiles

	Quartile 1 (<i>n</i> = 45)		Quartile 2 (<i>n</i> = 45)		Quartile 3 (<i>n</i> = 45)		Quartile 4 (<i>n</i> = 44)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Orthographic	4.64 ^{ab}	.560	4.82 ^a	.182	4.81 ^a	.148	4.83 ^a	.165
Phonological	4.61 ^{ab}	.482	4.76 ^{ab}	.212	4.84 ^a	.192	4.81 ^a	.168
Context- Orthographic	4.67 ^{ab}	.461	4.73 ^{ab}	.218	4.79 ^a	.110	4.78 ^a	.241
Context- Phonological	4.64 ^a	.405	4.69 ^b	.262	4.78 ^a	.245	4.82 ^a	.204
Context	4.68 ^{ab}	.463	4.69 ^{ab}	.313	4.83 ^a	.206	4.82 ^a	.168
Topic	4.70 ^b	.373	4.78 ^{ab}	.166	4.82 ^a	.160	4.83 ^a	.167

Note. Means in the same column followed by different letters are significantly different at $p < .003$. Average number of words written in 3 minutes. $N = 179$.

quartiles of writing fluency, no significant mean differences were found among conditions (Table 21).

Spelling achievement quartiles

Effects of the writing conditions on compositional spelling accuracy were evaluated for students who varied in spelling achievement. The students were divided into quartiles based on their score on the *Developmental Spelling Analysis* (Ganske, 1999, 2000). Because eight students did not participate in the letter-generation measure, the total sample analyzed was 177. An analysis of variance with repeated measures was conducted on the average compositional spelling accuracy scores of the students in the first quartile. The condition factor had a small effect ($\eta^2 = .05$) between writing conditions, $F(5, 240) = 2.60, p = .026$. Paired-sample *t* tests were used to evaluate

differences among writing conditions (see Table 22). The Bonferroni adjustment was used to conserve the family-wise Type I error rate. Accordingly, an alpha level of .003 was used to determine significance. For students with the lowest spelling achievement, the mean compositional spelling accuracy under the topic condition was significantly higher than the context-phonological condition, $t(48) = 3.57, p = .001$. No other significant mean differences were found among the writing conditions. No mean differences in the condition factor were found for students in the second, $F(5, 150) = .345, p = .885$; third, $F(5, 295) = .732, p = .600$; or fourth quartiles of spelling achievement, $F(5, 180) = .337, p = .890$ (Table 22).

Table 22
Mean Compositional Spelling Accuracy of Spelling Achievement Quartiles

	Quartile 1 ($n = 49$)		Quartile 2 ($n = 31$)		Quartile 3 ($n = 60$)		Quartile 4 ($n = 37$)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Orthographic	4.62 ^{ab}	.527	4.78 ^a	.189	4.82 ^a	.169	4.92 ^a	.082
Phonological	4.56 ^{ab}	.456	4.73 ^a	.213	4.83 ^a	.137	4.92 ^a	.130
Context- Orthographic	4.54 ^{ab}	.438	4.76 ^a	.184	4.78 ^a	.196	4.93 ^a	.086
Context- Phonological	4.47 ^a	.363	4.75 ^a	.195	4.81 ^a	.199	4.94 ^a	.126
Context	4.54 ^{ab}	.447	4.75 ^a	.289	4.82 ^a	.152	4.92 ^a	.142
Topic	4.63 ^b	.325	4.77 ^a	.224	4.82 ^a	.139	4.94 ^a	.076

Note. Means in the same column followed by different letters are significantly different at $p < .003$. Average number of words written in 3 minutes. $N = 177$.

Differences in Responses to Writing Conditions Among Groups

Compositional Fluency

In order to determine mean differences in compositional fluency among groups of interest, a 6 (condition) X 2 (Title 1) X 2 (gifted) X 2 (disability) X 2 (gender) X 3 (SES) mixed analysis of variance with repeated measures was conducted with condition as the between-subjects factor and letter-generating and letter-copying fluency and spelling achievement as covariates. Descriptive statistics are presented in Tables 23 to 26. Because not all of the participants were measured on the all the covariates, the total number of students included was 179. Averaged across all conditions, students with disabilities wrote the fewest words per 3 minutes with a mean of 22.60. The group with the next highest fluency was students in Title 1 with a mean of 24.22. The group with the highest compositional fluency was the gifted with a mean of 30.15 words per 3 minutes.

Table 23
Mean Compositional Fluency for Title 1 by Writing Condition

	Enrolled in Title 1		Not enrolled in Title 1	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Orthographic	21.37	9.54	25.11	11.88
Phonological	25.05	12.63	26.46	12.99
Context-Orthographic	24.47	10.33	24.30	11.44
Context-Phonological	23.29	13.52	25.64	11.88
Context	25.29	10.12	27.79	10.58
Topic	25.85	11.70	27.92	11.50

Note. *N* = 31 for Title 1 and 148 for not enrolled.

Table 24
Mean Compositional Fluency for Gifted by Writing Condition

	Enrolled in Gifted Program		Not enrolled in Gifted Program	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Orthographic	33.63	13.83	22.55	10.08
Phonological	29.58	16.66	25.80	12.04
Context-Orthographic	27.58	11.46	23.65	11.09
Context-Phonological	30.81	14.84	24.07	11.26
Context	29.61	10.98	26.95	10.38
Topic	29.71	10.97	27.11	11.71

Note. $N = 31$ for gifted education and 148 for not enrolled.

Girls ($M = 27.53$) wrote more than boys ($M = 24.13$) did and students who either paid a full- ($M = 26.68$) or reduced-price ($M = 26.64$) for lunch wrote more than students who received a free lunch ($M = 25.00$).

The analysis showed that one of the covariates (letter-copying fluency) had a medium ($\eta^2 = .06$) effect on the compositional fluency of the students under each condition, $F(1, 153) = 9.79, p = .002$. Writing condition also produced significant mean differences in compositional fluency, $F(5, 765) = 4.56, p = .000$ (see Table 27). The means separation was presented in Table 10.

Condition interacted with the covariate measures: letter-generating fluency, $F(5, 765) = 2.27, p = .046$ and spelling, $F(5, 765) = 4.88, p = .000$ as well as the gifted, $F(5, 765) = 4.15, p = .001$ and lunch, $F(10, 765) = 2.08, p = .024$ grouping variables.

Table 25
Mean Compositional Fluency for Special Education by Writing Condition

	Enrolled in Special Education		Not enrolled in Special Education	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Orthographic	19.45	11.78	25.07	11.44
Phonological	24.29	12.18	26.72	13.09
Context-Orthographic	21.42	12.86	24.67	11.01
Context-Phonological	23.47	11.98	25.44	12.22
Context	22.37	10.66	28.01	10.36
Topic	24.61	13.66	27.91	11.33

Note. $N = 19$ for special education and 160 for not enrolled.

Table 26
Mean Compositional Fluency for Socioeconomic Status by Writing Condition

	Full-Pay		Reduced		Free	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Orthographic	26.26	11.57	21.42	14.16	23.06	11.02
Phonological	27.59	14.26	27.33	10.75	25.16	11.86
Context-Orthographic	24.95	10.83	22.17	12.06	23.99	11.59
Context-Phonological	25.93	10.06	30.63	13.42	23.73	13.76
Context	27.49	9.42	29.29	9.77	27.05	11.70
Topic	27.88	11.50	29.00	12.70	27.01	11.65

Note. $N = 85$ for full-pay, 12 for reduced, and 82 for free lunch.

Table 27
Repeated Measures Analysis of Variance for Compositional Fluency

Source	<i>df</i>	Type III <i>SS</i>	<i>MS</i>	<i>F</i>	η^2	<i>p</i>
Between Subjects						
Letter Generating (L)	1	705.98	705.98	1.66	.011	.201
Letter Copying	1	4181.72	4181.72	9.79*	.060	.002
Spelling (S)	1	1254.40	1254.40	2.94	.019	.089
Title 1	1	539.97	539.97	1.26	.008	.263
Gifted (G)	1	2.62	2.62	.006	.000	.938
Disability	1	176.76	176.76	.414	.003	.521
Gender	1	1580.43	1580.43	3.70	.024	.056
SES	2	1037.42	518.71	1.21	.016	.300
Error	153	65368.49	427.25			
Within Subjects						
Condition (C)	5	1281.98	256.40	4.56*	.029	.000
C X L	5	638.19	127.64	2.27*	.015	.046
C X S	5	1373.88	274.78	4.88*	.031	.000
C X G	5	1166.74	233.35	4.15*	.026	.001
C X SES	10	1170.61	117.06	2.08*	.026	.024
Error (cond)	765	43037.48	56.26			
Total	957	123516.67	10453.33			

Note. The Huynh-Feldt adjustment was used. * Means significantly different at $p < .05$.

Interaction between condition and letter-generation fluency

Overall, students who generated more letters from memory wrote longer compositions in the time allowed (see Figure 4).

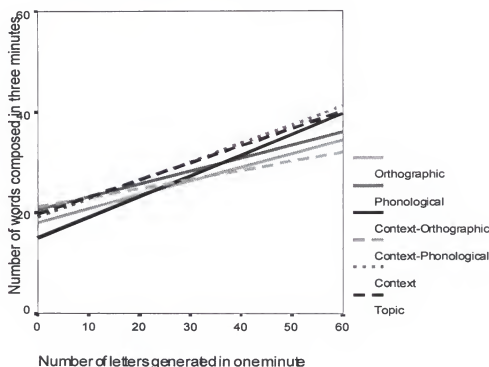


Figure 4. Regression of number of letters generated in one minute on mean compositional fluency in words per 3 minutes holding writing occasion constant ($N = 179$).

Follow-up analysis of the interaction between condition and letter-generating fluency was conducted using simple regression of letter-generating fluency on compositional fluency for each condition. Holding the levels of condition constant, an analysis of letter-generating fluency and compositional fluency was conducted. The Bonferroni adjustment was used to conserve the family-wise Type 1 error rate, yielding an alpha of .008. Letter-generating fluency had a significant effect on all of the writing conditions, except context-phonological. Writing conditions are presented in order of effect from letter-generation fluency: context-orthographic ($\beta = .413, p = .000$), context (β

$=.367, p = .000$), topic ($\beta = .42, p = .000$), orthographic ($\beta = .274, p = .001$), phonological ($\beta = .260, p = .004$), and context-phonological ($\beta = .184, p = .034$).

Interaction between condition and spelling achievement

In general, students who had higher spelling achievement wrote longer compositions in the time allowed (see Figure 5).

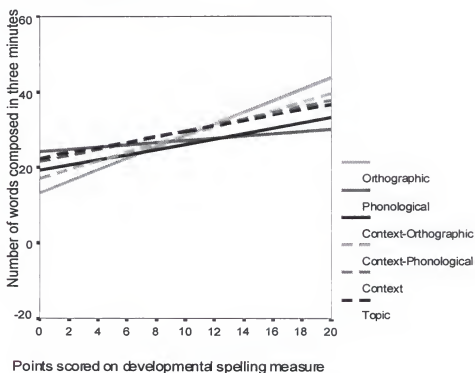


Figure 5. Regression of spelling achievement on mean compositional fluency in words per 3 minutes holding writing occasion constant ($N = 179$).

Follow-up analysis of the interaction between condition and spelling achievement was conducted using simple regression of spelling achievement on compositional fluency for each condition. Holding the levels of condition constant, an analysis of spelling achievement and compositional fluency was conducted. The Bonferroni adjustment was used to conserve the family-wise Type 1 error rate, yielding an alpha of .008. Spelling achievement had a significant effect on all conditions except phonological. Writing

conditions are presented in order of effect: orthographic ($\beta = 1.53, p = .000$), context-phonological ($\beta = 1.12, p = .000$), context ($\beta = .812, p = .001$), topic ($\beta = .717, p = .007$), context-orthographic ($\beta = .289, p = .006$), and phonological ($\beta = .289, p = .333$).

Interaction between condition and gifted

Follow-up analysis of the interaction between condition and spelling achievement was conducted using a one-way analysis of variance (ANOVA). Holding the levels of condition constant, a comparison between the two levels of the gifted factor was conducted. The Bonferroni adjustment was used to conserve the family-wise Type 1 error rate, yielding an alpha of .008. There were significant differences in the responses of gifted and nongifted students in the orthographic, $F(1,193) = 28.02, p = .001$ and context-phonological, $F(1,193) = 8.11, p = .005$ conditions (see Figure 6). No other significant mean differences were found.

Interaction between condition and socioeconomic status

Holding the levels of condition constant, a comparison between the three levels of SES was conducted using a one-way ANOVA. The Bonferroni adjustment was used to conserve the family-wise Type 1 error rate, yielding an alpha of .008. There were no significant group differences in the responses of students in each of the three lunch programs (Table 28).

Compositional Spelling Accuracy

A 6 (condition) X 2 (Title 1) X 2 (gifted) X 2 (disability) X 2 (gender) mixed analysis of variance with repeated measures was conducted with condition as the between-subjects factor and spelling achievement as a covariate. SES was removed

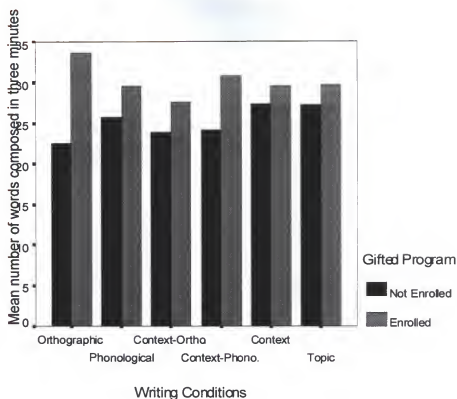


Figure 6. Mean compositional fluency in number of words composed in 3 minutes in each priming condition by membership in gifted program. ($N = 195$).

Table 28
ANOVA Source Table for SES by Writing Condition.

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>P</i>
Orthographic	2	373.58	186.80	1.45	.237
Error	192	24740.17	128.86		
Phonological	2	131.19	65.59	.399	.671
Error	192	31547.47	164.31		
Context-Orthographic	2	95.21	47.61	.373	.689
Error	192	24517.48	127.70		
Context-Phonological	2	410.03	208.02	1.43	.241
Error	192	27854.65	145.08		
Context	2	53.71	26.86	.236	.790
Error	192	2186.42	113.88		
Topic	2	6.85	3.42	.026	.975
Error	192	25757.23	134.15		

because it was neither a significant main effect nor in a significant interaction.

Descriptive statistics for each group by condition are presented in Tables 29 to 32.

Because not all of the participants were measured on the covariate, the total number of students included in this analysis was 179. Averaged across all conditions, students with disabilities had the lowest spelling accuracy with a mean of 4.55 (out of a possible 5).

The group with the next highest accuracy was students in Title 1 with a mean of 4.65.

The group with the highest average spelling accuracy was the gifted with a mean of 4.90.

Girls ($M = 4.78$) spelled more accurately than boys did ($M = 4.73$).

The analysis results are reported in the ANOVA source Table 33. There were significant main effects ($\alpha = .05$) due to condition, $F(4.95, 822.16) = 3.68, p = .003$, Title 1, $F(4.95, 822.16) = 6.72, p = .000$, gender, $F(4.95, 822.16) = 5.55, p = .000$, disability, $F(4.95, 822.16) = 5.39, p = .000$, and giftedness, $F(4.95, 822.16) = 6.57, p = .038$. The covariate had a large significant effect ($\eta^2 = .338$) on the spelling accuracy of the students, $F(4.95, 822.16) = 84.60, p = .000$. The students who scored higher on the spelling achievement test spelled more accurately in their written compositions.

There were also a number of interactions with condition. Spelling and condition interacted with a small effect, $F(4.95, 822.16) = 2.54, p = .028$ as did condition, disability, and Title 1, $F(4.95, 822.16) = 7.88, p = .000$, condition, gender, and disability, $F(4.95, 822.16) = 10.79, p = .000$, and condition with gender and Title 1, $F(4.95, 822.16) = 3.72, p = .003$.

Main Effects

Six repeated-measures t tests were conducted on the condition variable and the results were previously reported in Table 13. None of the conditions resulted in

Table 29
Mean Compositional Spelling Accuracy for Title 1 by Writing Condition

	Enrolled in Title 1		Not enrolled in Title 1	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Orthographic	4.68	.386	4.80	.306
Phonological	4.67	.251	4.77	.311
Context-Orthographic	4.66	.264	4.74	.302
Context-Phonological	4.58	.389	4.76	.265
Context	4.62	.423	4.78	.283
Topic	4.66	.245	4.81	.230

Note. $N = 31$ for Title 1 and 146 for not enrolled.

Table 30
Mean Compositional Spelling Accuracy for Gifted by Writing Condition

	Enrolled in Gifted Education		Not enrolled in Gifted Education	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Orthographic	4.89	.108	4.75	.346
Phonological	4.92	.139	4.72	.317
Context-Orthographic	4.90	.115	4.71	.318
Context-Phonological	4.90	.149	4.70	.308
Context	4.89	.156	4.73	.335
Topic	4.92	.130	4.76	.248

Note. $N = 29$ for gifted education and 148 for not enrolled.

Table 31
Mean Compositional Spelling Accuracy for Disability by Writing Condition

	Enrolled in Special Education		Not enrolled in Special Education	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Orthographic	4.48	.827	4.81	.178
Phonological	4.55	.664	4.78	.223
Context-Orthographic	4.46	.649	4.77	.215
Context-Phonological	4.63	.521	4.74	.261
Context	4.56	.639	4.77	.251
Topic	4.63	.501	4.80	.183

Note. *N* = 18 for special education and 159 for not enrolled.

Table 32
Mean Compositional Spelling Accuracy for Gender by Writing Condition

	Female		Male	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Orthographic	4.80	.178	4.76	.429
Phonological	4.77	.235	4.74	.365
Context-Orthographic	4.78	.209	4.70	.376
Context-Phonological	4.75	.234	4.71	.354
Context	4.78	.228	4.72	.389
Topic	4.81	.179	4.76	.291

Note. *N* = 92 for girls and 85 for boys.

Table 33
Repeated Measures Analysis of Variance for Average Spelling Accuracy

Source	<i>df</i>	Type III <i>SS</i>	<i>MS</i>	<i>F</i>	η^2	<i>P</i>
Between Subjects						
Spelling (S)	1	15.92	15.92	84.60*	.338	.000
Title 1 (T)	1	1.26	1.26	6.70*	.039	.011
Gifted (G)	1	1.24	1.24	6.57*	.038	.011
Disability (D)	1	4.90	4.90	26.01*	.135	.000
Gender (GN)	1	3.83	3.83	20.34*	.109	.000
GN X D	1	5.02	5.02	26.68*	.138	.000
GN X T	1	1.81	1.81	9.59*	.055	.002
D X T	1	1.07	1.07	5.67*	.033	.018
GN X D X T	1	1.58	1.58	8.39*	.048	.004
Error	166	31.25	.188			
Within Subjects						
Condition (C)	4.95	.563	.114	3.68*	.022	.003
C X S	4.95	.388	.078	2.54*	.015	.028
C X T	4.95	1.03	.208	6.72*	.039	.000
C X D	4.95	.824	.166	5.39*	.031	.000
C X GN	4.95	.849	.171	5.56*	.032	.000
C X T X D	4.95	1.21	.243	7.88*	.045	.000
C X T X GN	4.95	.568	.115	3.72*	.022	.003
C X D X GN	4.95	1.65	.333	10.79*	.061	.000
C X T X D X GN	4.95	.947	.191	6.19*	.036	.000
Error (cond)	822.16	25.39	.031			
Total						

Note. The Huynh-Feldt adjustment was used. * Means significantly different at $p < .05$.

significantly different spelling accuracy at an alpha of .003. Students enrolled in Title 1 ($M = 4.65$) spelled significantly less accurately than their peers not enrolled ($M = 4.78$). Boys ($M = 4.73$) also spelled significantly less accurately than girls did ($M = 4.78$). Students without disabilities ($M = 4.78$) spelled significantly more accurately than students with disabilities did ($M = 4.55$). Students in the gifted program ($M = 4.90$) spelled more accurately than students not in the program did ($M = 4.73$).

Interaction between condition and spelling achievement

Students who had higher spelling achievement spelled words more accurately in their compositions although the effect appeared to be larger for poor spellers.

Follow-up regression analysis of the interaction between condition and spelling achievement was conducted by holding the levels of condition constant for each analysis. The Bonferroni adjustment was used to conserve the family-wise Type I error rate, yielding an alpha of .008. Spelling achievement had a significant effect on all conditions with the largest effect in the context-phonological condition. Writing conditions are presented in order of effect: context-phonological ($\beta = .054, p = .000$), context ($\beta = .048, p = .000$), phonological ($\beta = .048, p = .000$), context-orthographic ($\beta = .047, p = .000$), orthographic ($\beta = .038, p = .000$), and topic ($\beta = .031, p = .000$).

Interaction between condition, disability, and Title 1

A 2 (disability) X 2 (Title 1 enrollment) ANOVA was conducted on each level of the writing condition factor to separate the means (see Table 34). The Bonferroni adjustment was used to conserve the family-wise Type I error rate, yielding an alpha of .008. The mean compositional spelling accuracy of students without disabilities was significantly higher than students with disabilities in the phonological, $F(1, 184) = 12.71$,

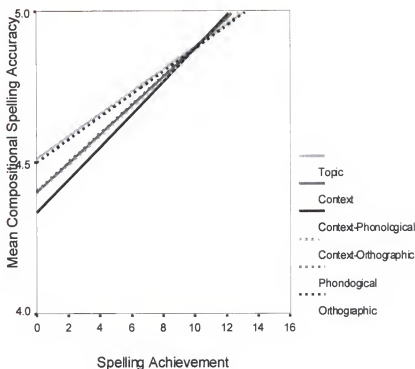


Figure 7. Regression of developmental spelling achievement on mean compositional spelling accuracy. ($N = 179$).

Table 34

Mean Compositional Spelling Accuracy for Title 1 and Special Education by Condition

	Special Ed. Title 1 ($n=8$)		No Spec. Ed. Title 1 ($n=27$)		Special Ed. No Title 1 ($n=11$)		No Spec. Ed. No Title 1 ($n=139$)		Total M
	M	SD	M	SD	M	SD	M	SD	
Orthographic	4.50 ^a	.680	4.71 ^a	.213	4.48 ^a	.919	4.83 ^a	.168	4.63
Phonological	4.56 ^a	.237	4.65 ^b	.333	4.52 ^a	.845	4.79 ^b	.214	4.63
Context-Orthographic	4.55 ^a	.403	4.67 ^b	.231	4.40 ^a	.771	4.79 ^b	.214	4.60
Context-Phonological	4.52 ^a	.528	4.59 ^a	.332	4.72 ^a	.500	4.77 ^a	.238	4.66
Context	4.52 ^a	.625	4.63 ^a	.348	4.59 ^a	.648	4.80 ^a	.226	4.63
Topic	4.67 ^a	.269	4.62 ^a	.286	4.60 ^a	.612	4.83 ^a	.158	4.68

Note. Means in the same row followed by different letters are significantly different at $p < .008$. Scores are based on a 0 to 5 scale. $N = 185$.

$p = .000$ and context-orthographic, $F(1, 184) = 11.91, p = .001$ regardless of enrollment in Title 1. Nonsignificant mean differences due to disability or Title 1 were not found for other conditions.

Interaction between condition, disability, and gender

A 2 (disability) X 2 (gender) ANOVA was conducted on each level of the writing condition factor to determine significant mean differences (see Table 35). The Bonferroni adjustment was used to conserve the family-wise Type 1 error rate, yielding an alpha of .008. Significant differences in mean compositional spelling accuracy due to disability and gender had medium effects ($\eta^2 = .091$ and $.078$) in the orthographic condition (disability, $F(1, 184) = 18.22, p = .000$; gender, $F(1, 184) = 15.36, p = .000$) and small effects ($\eta^2 = .040$ and $.046$) in the context condition (disability, $F(1, 184) = 7.48, p = .007$; gender, $F(1, 184) = 8.81, p = .003$). These significant differences led to group differences among boys and girls with disabilities and boys and girls without disabilities. Students without disabilities spelled significantly more accurately than students with disabilities regardless of gender in the phonological, $F(1, 184) = 9.36, p = .003$, context-orthographic, $F(1, 184) = 18.42, p = .000$, and topic, $F(1, 184) = 7.55, p = .007$ conditions. Nonsignificant mean differences due to disability or gender were not found for other conditions.

Interaction between condition, gender, and Title 1

A 2 (Title 1) X 2 (gender) ANOVA was conducted on each level of the writing condition factor to determine significant mean differences (see Table 36). The Bonferroni adjustment was used to conserve the family-wise Type 1 error rate, yielding an alpha of .008. Significant differences in mean compositional spelling accuracy due to

Table 35
Mean Compositional Spelling Accuracy for Disability and Gender by Condition

	Special Ed. Male (<i>n</i> = 10)		Special Ed. Female (<i>n</i> = 9)		No Spec. Ed. Male (<i>n</i> = 80)		No Spec. Ed. Female (<i>n</i> = 86)		Total
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>
Orthographic	4.22 ^a	1.04	4.79 ^b	.185	4.82 ^c	.184	4.80 ^d	.178	4.66
Phonological	4.40 ^a	.877	4.69 ^a	.165	4.76 ^b	.247	4.78 ^b	.238	4.66
Context- Orthographic	4.33 ^a	.809	4.61 ^b	.340	4.74 ^c	.253	4.80 ^d	.183	4.62
Context- Phonological	4.57 ^a	.681	4.71 ^a	.218	4.72 ^a	.287	4.76 ^a	.237	4.69
Context	4.36 ^a	.808	4.78 ^b	.183	4.76 ^c	.281	4.78 ^d	.231	4.67
Topic	4.55 ^a	.659	4.72 ^a	.168	4.78 ^b	.218	4.81 ^b	.180	4.71

Note. Means in the same row followed by different letters are significantly different at *p* < .008. Scores are based on a 0 to 5 scale. *N* = 185.

Table 36
Mean Compositional Spelling Accuracy for Title 1 and Gender by Condition

	Title 1 Male (<i>n</i> = 11)		Title 1 Female (<i>n</i> = 24)		No Title 1 Male (<i>n</i> = 79)		No Title 1 Female (<i>n</i> = 71)		Total
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>
Orthographic	4.52 ^a	.579	4.73 ^a	.210	4.78 ^b	.388	4.82 ^b	.160	4.71
Phonological	4.44 ^a	.393	4.71 ^a	.229	4.76 ^b	.364	4.79 ^b	.233	4.68
Context- Orthographic	4.44 ^a	.263	4.73 ^b	.236	4.73 ^c	.375	4.80 ^d	.196	4.68
Context- Phonological	4.44 ^a	.504	4.64 ^a	.295	4.74 ^b	.309	4.79 ^b	.199	4.65
Context	4.40 ^a	.607	4.70 ^b	.263	4.76 ^c	.331	4.81 ^d	.207	4.67
Topic	4.49 ^a	.323	4.69 ^b	.237	4.79 ^c	.283	4.84 ^d	.141	4.70

Note. Means in the same row followed by different letters are significantly different at *p* < .008. Scores are based on a 0 to 5 scale. *N* = 185.

Title 1 enrollment and gender were found in the context-phonological (Title 1, $F(1, 184) = 9.05, p = .003$; gender, $F(1, 184) = 8.98, p = .003$), context (Title 1, $F(1, 184) = 14.93, p = .000$; gender, $F(1, 184) = 8.51, p = .004$), and topic (Title 1, $F(1, 184) = 22.38, p = .000$; gender, $F(1, 184) = 7.30, p = .008$) conditions, leading to group difference among boys and girls enrolled in Title 1 and boys and girls not enrolled. Students not enrolled in Title 1 spelled significantly more accurately than students receiving Title 1 services regardless of gender in the orthographic, $F(1, 184) = 7.85, p = .006$, phonological, $F(1, 184) = 10.61, p = .001$, and context-phonological, $F(1, 184) = 15.71, p = .000$ conditions.

Contributions to Compositional Fluency and Spelling Accuracy

Compositional Fluency

Multiple regression analysis was used to determine which variables explained the variance within compositional fluency in the context condition. This condition was chosen because it produced the longest compositions in the 3-minute period.

Four variables and their interactions were of interest: reading comprehension, letter-generating fluency, letter-copying fluency, and spelling achievement. The most complex model was run and then simplified by removing the nonsignificant variables in each stage. Among the second-grade students, three variables explained 20% of the variance in compositional fluency under the context condition: letter generating fluency ($\beta = .198, p = .022$), letter copying fluency ($\beta = .154, p = .006$), and spelling achievement ($\beta = .198, p = .002$).

Spelling Accuracy

Multiple regression analysis was used to determine which variables accounted for the variance within average spelling accuracy in the context condition. Four variables and their interactions were of interest: reading comprehension, letter-generating fluency, letter-copying fluency, and spelling achievement. The most complex model was run and then simplified by removing the nonsignificant variables in each stage. Among the second-grade students, three variables explained 30% of the variance in average spelling accuracy under the context condition: reading comprehension ($\beta = .004, p = .000$), spelling achievement ($\beta = .344, p = .000$), and the interaction between reading comprehension and spelling achievement ($\beta = -.0005, p = .000$).

CHAPTER 5 DISCUSSION

This study addressed three questions related to the effects of six priming conditions on the writing of second graders. The first question concerned the role of the priming conditions on the compositional fluency and spelling accuracy of second graders. Would there be differential effects due to conditions among the whole group and smaller subgroups? The second question asked whether the effects seen among the students would be different in groupings based on ability, gender, and socio-economic status. The third asked what variables explain the variance in the observed compositional fluency and spelling accuracy. The results in response to these questions are summarized in Table 37.

Theoretical Implications

Compositional Fluency

Priming conditions

Whole group. The context condition produced the highest compositional fluency and was significantly higher than the orthographic, context-orthographic, and context-phonological conditions. It was not significantly larger than the phonological or topic conditions. It is possible that the context and topic conditions produced longer stories because they were the conditions most often used by teachers and students. These two conditions were comfortable and known, while the others were unfamiliar.

Adams's (1990) model is not sufficient to explain the differences in compositional fluency that were found. There appear to be more factors involved during

Table 37
Summary of Findings

<i>Effects of Priming Conditions</i>	
Whole Sample	Topic, Context, and Phonological priming conditions produced the same facilitation in compositional fluency. No significant differences were found in compositional spelling accuracy.
Lowest Achieving Students	Larger effect in compositional fluency than whole sample. Orthographic and context-orthographic conditions produced significantly lower compositional fluency than all other conditions. Topic condition produced significantly higher spelling accuracy for students in the first quartile of spelling achievement.
Highest Achieving Students	Topic and context conditions produced significantly higher compositional fluency than the orthographic or context-orthographic conditions did. No significant differences in spelling accuracy.
<i>Differences in Group Responses to Priming Conditions</i>	
Compositional Fluency	Students who copied letters faster wrote significantly longer compositions in the time allotted. No significant differences due to presence of a disability, socioeconomic status, or gender. A significant interaction between priming conditions and each of letter-generation fluency, spelling achievement, and giftedness led to uneven responses among groups to the priming conditions.
Compositional Spelling Accuracy	Students with higher spelling achievement spelled words significantly more accurately in their compositions. Students in each of Title 1 and special education had significantly lower spelling accuracy than peers not enrolled. Girls and students in gifted programs spelled significantly more accurately than boys and students not enrolled. Interactions between priming conditions and gender, disability, and Title 1 led to uneven responses among groups to the priming conditions.
<i>Contributions to Compositional Fluency and Spelling Accuracy</i>	
Compositional Fluency	Letter generating fluency, letter copying fluency, and spelling achievement explained 20% of the variance.
Compositional Spelling Accuracy	Reading comprehension, spelling achievement, and the interaction between reading comprehension and spelling achievement explained 30% of the variance.

composition in a natural setting than can be accounted for by a connectionist model of sound-symbol-meaning relationships (Berninger et al., 1997; Scardamalia & Bereiter, 1986). Additions from Berninger and her colleagues (Berninger, 1999; Berninger, Abbott, Whitaker, Sylvester, & Nolen, 1995) seem warranted (see Figure 8). Their explanatory model of compositional processes includes three nonsequential phases: planning), translating, and reviewing. During the planning phase, ideas are generated and organized and writing goals are set. These ideas are translated into mental language during the text generation phase of the translating phase. After the mental language has

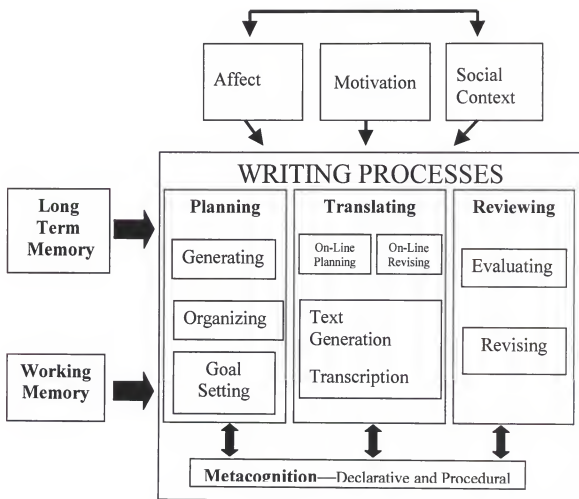


Figure 8. Adaptation of Berninger, Abbott, Whitaker, Sylvester, & Nolen (1995) model of compositional processes in beginning and developing writers.

been generated, it is then transcribed into written language. It is during the transcription portion of the process that handwriting fluency and spelling accuracy are particularly important. In the review process, ideas, mental language, and/or written language are evaluated and revised. It is important to note that these are not linear processes, but ones that can interrupt each other and can take place within each other. For example, if a writer writes her plans and goals down, the translating phase takes place during the planning phase. Also, if a writer considers and then rejects various topics, he is revising during the planning phase. Berninger et al. also incorporate the nonacademic variables of affect, motivation, and social context into the model. These variables could be very important to children with writing difficulties, as a lack of positive experiences in writing could lead to lack of motivation and a resultant decrease in fluency.

While considering this model, the lack of detail in the transcription part of the translating phase is troubling while trying to understand the processes important in compositional fluency for young children. According to Berninger (1999) and Graham (1999), the transcription skills of handwriting and spelling are particularly important to young developing writers such as the second graders in this study. Because the Adams model has power to explain spelling accuracy and children's access to letter names and forms, it seems that a more explanatory model integrates her model into the larger Berninger et al. model of composition. When focused on the macro task of composition, the Berninger et al. model serves to explain a great deal. While considering the micro task of translating mental language to written language, the Adams model serves to provide an explanation of the processes involved. The translating portion of the resulting model is pictured in Figure 9.

Using this expanded model of composition that includes information from both the Berninger et al model and the Adams model, the results of this study can be better explained. The contextual priming condition could have facilitated the compositional fluency of the students by providing time for idea generating, text generation, and facilitation to the transcription task by priming the meaning processor (Adams, 1990). The phonological condition provided the same amount of facilitation due to the priming effect from dictating the story starter. This shows that providing priming to the

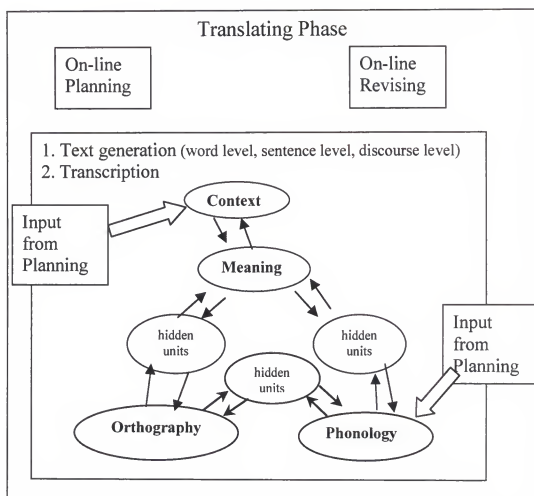


Figure 9. Translation phase of Berninger et al. model modified by inclusion of Adams' reading and spelling model.

phonological processor in the direction of writing produced the same level of facilitation as time to plan, generate language, and priming to the meaning processor. The lack of similar positive response in the context-phonological condition could be due to the length of this story starter condition. The students first discussed the topic, generating ideas that were then, perhaps, lost or forgotten as they focused their processing on generating letters from dictated words. This difficult task interposed between idea generation and composition negated the facilitative effect. There was insufficient capacity in the students' working memory for holding both the previously generated ideas and the processing necessary to write from dictation. Neither the teacher nor the students were allowed to make notes of their ideas. Without this "extra memory" (Graham, 1997, in Berninger, 1999) provided by written notes, the capacity-limited working memory was insufficient. The lack of facilitation found in the orthographic and context-orthographic conditions could be due to the directionality of the priming as well as the problem with holding ideas previously generated. While copying and then reading the story starter, the orthographic forms activated the phonological forms (Adams, 1990; Perfetti, 1997), and it seems likely that this initial processing in the opposite direction not only failed to facilitate the students' compositional fluency but also inhibited it.

Subgroups. The combination of the larger Berninger et al. (1995) model and the Adams (1990) model also has power to explain the results found in the subgroups of students. Among the below-average readers, the effect of the writing conditions was much larger than in the whole sample, $\eta^2 = .11$ for the lowest 25% of the readers and $\eta^2 = .07$ in the second quartile. They both found the least facilitation in the orthographic and context-orthographic conditions. The larger effect size for below-average readers could

be due to their weaker knowledge of the alphabetic system (Ehri, 1997). The inhibitory effect of going from orthographic to phonological to orthographic forms may be larger in those students whose sound-symbol relationships are weak or missing. This suggests that, for below-average readers, presenting story starters in ways that focus on generating ideas (planning phase) or priming the phonological to orthographic processing paths are facilitative in writing longer stories. For above-average readers, the method of presenting a story topic did not appear to make a difference in their compositional fluency. Perhaps for these students, their sound-symbol and orthographic forms are sufficiently automatic to allow planning and text-generation even while copying or writing from dictation. The measure of reading achievement focused on reading comprehension, and working memory span plays a role in both reading comprehension and composition (Berninger, 1999). This may mean they had a larger capacity in their working memories for simultaneously copying and planning.

An examination of the effects of the writing conditions on the compositional fluency of students who differ in their ability to generate letters from memory revealed differential effects only for the slowest and fastest writers, with a larger effect for the slower writers. Again, the context-orthographic and orthographic conditions produced the lowest compositional fluency, with significant differences from all other conditions among the slowest writers and from the context and topic conditions for the fastest writers. Handwriting fluency exerts limits on the ability of developing writers to translate oral language into written language (Berninger, 1999). This limit among the slowest writers may make them more susceptible to the inhibitory effects of the orthographic to phonological priming. The context and topic conditions produced significantly higher

compositional fluency among the fastest writers because of their hypothesized ability to plan and generate text while they copy.

A similar effect was found in groupings based on spelling achievement. For the poorest spellers, condition had a medium effect ($\eta^2 = .09$) and both the orthographic and context-orthographic conditions produced compositional fluency significantly lower than the topic condition. The difference between the orthographic and phonological conditions approached significance. This effect among the poorest spellers was not surprising. Perfetti (1997) argued that spelling is the purest indicator of the quality of word representations in a child's memory. With poor representations, it would be difficult to write or spell words quickly and easily, leading to difficulty transcribing text. The inhibitory effect of the orthographic to phonological priming may be particularly troubling to children who are already experiencing difficulty generating and translating text.

While the effect was smaller, the best spellers appeared to benefit the most from the context condition. This suggests that their transcription skills are already quite automatic and the opportunity to plan as well as the priming to the meaning processor was the most facilitative. For the students who scored in the middle two quartiles in spelling, the conditions did not produce significantly different compositional fluency, perhaps because their spelling skills were neither impaired nor highly developed.

Writing occasion

The effect of writing occasion was significant, indicating that as the students wrote more often, they wrote longer compositions in the time allowed. This could be due to a cumulative effect of experiencing the different types of story starter presentations.

For children who have experienced a limited range of methods of presenting story topics, trying new ways of processing the topic prior to writing may have revealed previously unknown approaches to the writing task and increased the students' compositional fluency. The effect was an uneven one, with occasion five producing significantly higher compositional fluency than all other occasions. This could be a result of differential preference for the story topics because a new topic was presented on each occasion. Perhaps the students preferred the topics presented at the end of the writing sequence more than those presented at the beginning.

Compositional Spelling Accuracy

The priming conditions produced a very small significant effect ($\eta^2 = .01$) on the compositional spelling accuracy of the second-grade students that was not significant upon further investigation. Additionally, there were no significant differences due to writing occasions. Among groups of students at different levels of reading achievement, no significant differences were found due to priming condition. For students who differed on their ability to generate letters quickly and accurately, no differences were found among the slowest or above-average writers. Among students defined by spelling achievement, a small effect was found among the students in the lowest quartile, but no significant differences were found among the students in the second to fourth quartiles.

These findings could be due to the lack of variability in the spelling accuracy of the students. As a group, the students produced conventional spellings for 88% of the words analyzed with many students reaching a score of 100%. Because spelling in English is affected by both morphological and orthographic constraints as well as sound-symbol relationships (e.g., *nation* and *national* maintain morphological information at the

expense of sound-symbol regularity), manipulating priming along phonological and orthographic routes may have been insufficient to affect compositional spelling accuracy. In addition, previous research in orthographic and phonological priming focused on the spelling accuracy of nonwords and how similar nonwords were spelled to phonological (Campbell, 1983, 1985) and orthographic (Goswami, 1988; Nation & Hulme, 1996) primes. This study did not examine the influence of the word forms in the story starter on the spelling patterns in the children's writing. To date, no other research has been done on the effects of priming conditions on compositional spelling accuracy.

Providing a topic, discussion to begin idea generation and to activate the meaning processor, or dictation to prime in the direction of writing (sound to print) produced the same facilitation in compositional fluency among all of the second-grade students. For the lowest achieving students in reading, writing fluency, and spelling achievement, the effects of the writing conditions were larger than the entire sample or the higher achieving students. The topic, context, phonological, and context-phonological conditions all produced significantly higher compositional fluency than the orthographic or context-orthographic conditions. Among the highest achieving students in reading, writing fluency, and spelling achievement, the topic and context conditions provided the most facilitation and were significantly higher than the orthographic or context-orthographic conditions.

Adams (1990) suggested that reading and writing use the same processors, with writing moving from the phonological processor to the orthographic (i.e., from sound to print). The finding that, for all of the groups of students examined, the orthographic and context-orthographic conditions produced the least writing fluency provides support for

her contention. The overlap between the processing in the direction of reading (i.e., copying and reading) was less than providing an opportunity to plan, generate mental language, and priming to the context processor (i.e., discussing) or in the direction of writing (i.e., dictation), and thus provided less priming effect. For students with poor word representations, the priming that occurred in the direction of reading actually produced an inhibitory effect.

Comparison of Group Difference in Response to Writing Conditions

Differences in responses of students to the writing conditions based on group differences defined separately from this investigation and useful to planning classroom interventions were of interest. Groups based on gender, ability, Title 1 enrollment, and socioeconomic status were compared.

Compositional Fluency

Students who could copy letters faster wrote longer compositions in the time allotted than students with lower writing fluency did. This finding is consistent with those of Graham et al. (1997) and Berninger et al. (1997), who found that handwriting training transferred to increased compositional fluency among first-grade struggling writers. There were no significant differences due to presence of a disability, socioeconomic status, or gender. The finding related to gender is similar to those of Graham, Berninger, Weintraub, and Schafer (1998), who found that girls wrote faster than boys in all grades but only significantly faster in Grades 1, 6, and 7. There were no significant differences in this research study between boys and girls in letter-generation, sentence copying, or compositional fluency although the girls wrote faster in all situations.

There was an interaction between letter-generating fluency and the writing conditions. The ability to generate letters quickly and accurately from memory had a significant effect in all the conditions except the context-phonological. The effect of letter-generating fluency was largest in the context-orthographic condition, where students who generated letters slowly had the least compositional fluency while it produced the very highest compositional fluency for the children who could generate letters quickly and accurately. It is possible that children who were automatic in the transcription skill of handwriting were able to copy and simultaneously maintain the ideas they had previously generated for their composition due to the low demands of the copying task on their working memory. Writing fluency had no effect in the context-phonological condition, where students responded similarly regardless of writing fluency levels.

There was also an interaction between spelling achievement and the writing conditions. Students who spelled well had higher compositional fluency than students who spelled poorly did, agreeing with the findings of Graham et al. (1997). The condition where it made the most difference was the orthographic condition, where for the students with low spelling achievement, it produced the least fluent compositions, and for the students with high spelling achievement, it produced the highest. This suggests that for students with poor transcription skills, the orthographic to phonological priming route was inhibitory while the students with strong mental representations of words were able to both copy the starter and simultaneously plan their composition. There was no effect in the phonological condition, meaning that students responded similarly to it regardless of spelling achievement.

Another interaction was found between the writing conditions and giftedness; gifted students wrote significantly longer compositions than their nongifted peers in the orthographic and context-phonological conditions. They wrote longer compositions in all conditions, but the others did not reach significance. The priming from orthography to phonology in the orthographic condition could have interfered in the process of transferring sound to symbol among the nongifted students while the well-developed and automatic language processing of the gifted students may have been impervious to the effect. The copying task may have been sufficiently simple to students with automatic transcription skills to allow them to plan and copy simultaneously due to low demands on their working memory due to the copying task.

Compositional Spelling Accuracy

The writing conditions had a very small effect on the compositional spelling accuracy of the second-grade students, and this effect was not large enough to register in follow-up procedures. Students who had higher spelling achievement spelled words more accurately in their compositions although, due to an interaction between condition and spelling achievement, the effect appeared to be larger for poor spellers.

Larger effects on compositional spelling accuracy were found due to membership in groups. Membership in Title 1 had a smaller effect than disability, which had a medium effect of $\eta^2 = .14$. Students enrolled in Title 1 spelled significantly less accurately than their peers not enrolled, and students with disabilities spelled significantly less accurately than students without disabilities. Due to an interaction between Title 1 and special education, further analysis showed that students with disabilities spelled

significantly less accurately than students without disabilities did regardless of Title 1 enrollment in the phonological and context-orthographic conditions.

Gender had a medium effect of $\eta^2 = .11$ with girls spelling significantly better than boys. The findings related to gender are consistent with the results of Sanchez, Kellow, and Ye (2000) who found that girls had significantly higher scores than boys on the reading, language, and spelling subtests of the Stanford Achievement Test (SAT-9). Allred (1990), in an examination of spelling achievement, also found that girls in general spell better than boys, a finding supported by evidence from second-grade children who speak Finnish (Luotonen, Uhari, Uhari, Aitola, Lukkaroinen, & Luotonen, 1998).

Gender interacted with disability with the result that boys with disabilities spelled the least accurately. Boys without disabilities spelled less accurately than girls with and without disabilities. The context-phonological condition was the single exception, where boys and girls responded similarly to the condition regardless of disability status. Gender also interacted with Title 1 status, with the result that boys in Title 1 spelled the least accurately in the context-orthographic, context, and topic conditions. In the remaining conditions, students in Title 1 spelled least accurately than students not in Title 1 regardless of gender. In order to determine why boys and girls with and without disabilities and enrollment in Title 1 responded differently to the priming conditions, more information is needed. This is an area fruitful for further research.

Giftedness had a small effect on the compositional spelling accuracy of students. Students in the gifted program ($M = 4.90$) spelled more accurately than students not in the program did ($M = 4.73$).

Summary

For students who write slowly or have low spelling achievement, increased compositional fluency may be fostered using story starter conditions that focus on generating ideas to write about and phonology-to-orthography priming. Teachers of such students should avoid story starters that involve copying of the starter.

The picture is less clear with regard to compositional spelling accuracy. Students with disabilities spelled less accurately than their peers, with boys with disabilities performing the worst. Students in Title 1 spelled less accurately than students not in Title 1 except for students with disabilities, who spelled significantly worse regardless of enrollment in Title 1. Overall, girls spelled more accurately than boys did except for girls in Title 1 in three of the conditions. Gifted students spelled more accurately than their nongifted peers in all conditions. More research is needed in the area of responses to the priming conditions among girls and boys with and without disabilities. More data are needed on additional variables.

Contributions to Compositional Fluency and Spelling Accuracy

Among the entire sample of second-grade students, three variables explained 20% of the variance in compositional fluency under the context condition: letter generating fluency, letter copying fluency, and spelling achievement. This is similar to, but substantially less than, the findings of Graham et al. (1997) who reported that handwriting speed accounted for 66% of the variance of the compositional fluency at the primary level and spelling achievement accounted for 41% of the compositional fluency variance. The lack of such high percentages of variance explained in the present study may be due to the possibility of variability between teachers and how the teachers

delivered the writing fluency probes as well as the story starters. A limitation of the current study is a lack of oversight over the standardization of presentation among the 18 teachers, and this may explain the different findings. Because of the lack of verification of how the measures and conditions were presented, it is unknown whether the teachers varied in their presentation. Perhaps variability in the presentation can account for the different findings, but it is unclear.

There was a higher level of explanatory power in the compositional spelling accuracy variable. Three variables explained 30% of the variance in average spelling accuracy under the context condition: reading comprehension, spelling achievement, and the interaction between reading comprehension and spelling achievement. There is a linear relationship between reading comprehension and spelling achievement; students who scored low on the spelling test also scored low on the reading comprehension test.

Limitations to the Present Study

The findings of this study are limited regarding generalizability, treatment integrity, confounding of variables, a possible practice effect, and important variables that were not included in the study. The results are limited in generalizability to second-grade students and are not applicable to students younger or older. Due to the schedule at the end of the school year, students who missed one or more of the writing occasions were removed rather than administered the writing probe at a different time. It proved impossible to make up any writing sessions with the students due to field trips, special events, and end-of-the-year assessments. This may have changed the sample in systematic ways that make it different from the population of interest. In addition, it proved impossible to randomly assign individual students to the sequences of writing

conditions. Instead, they were randomly assigned in intact groups. These groups may have been systematically different from one another. It is unclear whether preexisting group differences existed and if so, whether they were due to teacher, grouping, or individual differences.

Treatment fidelity, or potential lack of it, may have posed a limitation. There were no systematic observations of how the teachers delivered the writing fluency and spelling probes as well as the writing conditions. Some of the variance seen in the findings may be due to differences in administration not included in the writing conditions as described.

Because the story topics and occasions changed at the same time, they are confounded, and it is unclear whether the differences seen in writing fluency due to occasion are a result of the occasion they were written on or some aspect of the story topic, such as the relative appeal or familiarity of a particular topic. Because compositional fluency increased as the students wrote more, there could have been a practice effect not due to the priming conditions.

There were several variables that were not included in this study. It is possible that there were intervening variables (i.e., teacher, discussion between students, processing load of composing, help spelling words) between the priming condition and the composition of the students. The lack of measurement of these variables makes it unclear whether they were present, but if so, they may have masked possible effects on the compositional spelling accuracy of the students. In addition, the model of the compositional process includes important variables that were also not measured in this study. Specifically, a measure of working memory (McCutchen, 1988) has potential to

help explain some of the differences that were found. Also, affect and motivation are potentially critical variables that should be taken into account. It is possible that some of the results in this study are due to students enjoying one priming condition over another or that previous difficulty in writing led to task avoidance among slower or struggling writers.

Implications for Future Research

The results and limitations of the current study provide implications for future research. A follow-up study analyzing the effects of the writing conditions on the quality of the student compositions seems a natural next step in light of the finding of Graham et al. (1997) that handwriting fluency and spelling achievement have significant effects on compositional quality as well as fluency. In addition, to address several limitations of the present study, removing the compound conditions that seemed to negate themselves (i.e., context-orthographic and context-phonological), using decoding measures such as nonword decoding rather than reading comprehension, measuring nonacademic variables such as working memory, affect and motivation, and including measures of how well the teachers deliver the story starter conditions will improve the quality of a future study. To better examine the effects of priming conditions on the spelling of young children, a study may benefit from the use of more tightly controlled priming with a specific list of words and nonwords to be spelled and words used for priming rather than a free-writing situation in a natural classroom setting.

Because significant differences were found for students in the lowest quartile of performance in generating letters from memory, reading achievement, and spelling achievement, further study of the effects of priming for this population, which includes

both students at risk and with disabilities, is warranted. Both students with speech, language, or learning disabilities or enrolled in Title I and below-average in letter-generation fluency and spelling achievement are important students to understand. Research to identify the features of appropriate writing instruction for this population is a critical need.

Another population requiring more research on methods of promoting compositional fluency are English-as-a-second-language learners. Investigation of methods to increase their writing proficiency in English is lacking, and they too are at risk for school failure. Of particular interest is the interaction of the priming conditions and the learning preferences of culturally and linguistically diverse students.

Conclusion

There are several implications for educational practice resulting from this research: response differences among groups of children, importance of modeling different approaches, and instructional recommendations for struggling writers. One aspect that is clear is that children responded differently to the various ways of presenting the story topics. Teachers should be sensitive to this and be flexible in how writing time is structured and how topics are presented. In addition, because of the increase in compositional fluency as students experienced the variety of presentations, it is important to provide instruction and modeling in a variety of approaches to writing narratives. As more is known about learning preferences, especially among culturally and linguistically diverse students, this may prove to be a powerful way to accommodate student diversity in the classroom and improve writing achievement.

Among students who struggle in writing, teachers should pay special attention to how story topics are presented. It is clear that students who write slowly or spell poorly experience differences in topic presentation more than their average or high-achieving peers do. It is also clear that these students compose more slowly and spell more poorly than their peers. These effects are especially apparent in the copying method of topic presentation. Teachers of struggling writers should focus their pre-writing activities on activities to generate ideas, language representations, and to prime the pathways from sound to print (dictation) in order to facilitate the compositional fluency of their students. Instruction in handwriting fluency and spelling seem warranted for struggling writers in light of their important roles in compositional fluency and spelling accuracy. Past research by Berninger et al. (1997) indicated that explicit and intense instruction in handwriting fluency and spelling transfers to composition in struggling writers. This instruction should be provided in a meaningful context with an eye to transfer to composition. Writing instruction is an increasingly important area in schools as high-stakes achievement testing becomes more common and standards for writing competence rise. Additional emphasis on both the research of writing processes and classroom practices to support struggling writers is needed.

APPENDIX A
EXAMPLE STORY PROMPT FROM
NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS

Section 1

One morning a child looks out the window and discovers that a huge castle has appeared overnight. The child rushes outside to the castle and hears strange sounds coming from it. Someone is living in the castle!

The castle door creaks open. The child goes in.

Write a story about who the child meets and what happens inside the castle. S1000643

1. One morning a child looks out the window and discovers that a huge castle has appeared overnight. The child rushes outside to the castle and hears strange sounds coming from it. Someone is living in the castle!

The castle door creaks open. The child goes in.

Write a story about who the child meets and what happens inside the castle.

"Wow a castle!" said John. He had know clue of how it got here or where it came from. He walked inside and found that it was rather damp. He wandered around until finally he saw someone. This person didn't look normal. He was dressed in royalty with a purple cape and a crown of jewels. Then the person spoke out "Here you are you're supposed to be training right now." John had know clue what he was talking about. Suddenly he thought of something was this the King of the castle? He finally got the nerve to ask a question. He asked "Who are you?" He answered "I'm the King." John was shocked. Then the King told him to get on his armor. John thought and thought then he knew what he was talking about. He thought he was a knight. John thought again. If he was the a knight then he ^{should} see his family again. Then he thought of his older sister Jennifer. He decided to be a knight. After about 2 months he finally was knighted. He fought many dragons and men. He finally died but is still a legend today.

The End

APPENDIX B
EXAMPLE STORY PROMPTS FROM
FLORIDA COMPREHENSIVE ACHIEVEMENT TEST



**Curriculum, Instruction
& Assessment
| Assessment &
Evaluation**

Florida Department of Education

Public Schools

[FCAT Home Page](#)

Description of the 2000 FCAT Writing Prompts

GRADE 4

Writing to Explain

Students responded to a topic that required them to explain why a day of the week is their favorite.

Writing to Tell a Story (Narrative)

Students responded to a topic that required them to tell a story about what happened when they had a special time with a friend.

GRADE 8

Writing to Explain

Students responded to a topic that required them to explain why a particular day is special.

Writing to Persuade

Students responded to a topic that required them to convince the teacher to visit a particular place on a field trip.

GRADE 10

Writing to Explain

Students responded to a topic that required them to explain why they might choose to spend a day with a particular person.

Writing to Persuade

Students responded to a topic that required them to convince the principal to accept their opinion on whether the length of class periods should be changed.

APPENDIX C
INSTITUTIONAL REVIEW BOARD APPROVAL



UNIVERSITY OF FLORIDA

Institutional Review Board

98A Psychology Bldg.
PO Box 112250
Gainesville, FL 32611-2250
Phone: (352) 392-0433
Fax: (352) 392-9234
E-mail: irb2@ufl.edu
<http://web.ortge.ufl.edu/irb/irb02>

DATE: 22-Mar-2001

TO: Ms. Roxanne Hudson
G315 Norman Hall
Campus

FROM: C. Michael Levy, Chair *cmf/dl*
University of Florida
Institutional Review Board

SUBJECT: Approval of Protocol # 2001 - 178

TITLE: The Effects of Six Writing Conditions on the Writing Fluency and Spelling Accuracy of
Second Grade Students

FUNDING: Unfunded

I am pleased to advise you that the University of Florida Institutional Review Board has recommended approval of this protocol. Based on its review, the UFIRB determined that this research presents no more than minimal risk to participants, and based on 45 CFR 46.117(c), authorizes you to administer the informed consent process as specified in the attached description.

If you wish to make any changes to this protocol, including the need to increase the number of participants authorized, you must disclose your plans before you implement them so that the Board can assess their impact on your protocol. In addition, you must report to the Board any unexpected complications that affect your participants.

If you have not completed this protocol by 20-Mar-2002, please telephone our office (392-0433), and we will discuss the renewal process with you.

It is important that you keep your Department Chair informed about the status of this research protocol.

CML:dl/js

cc: Dr. Holly Lane

Equal Opportunity/Affirmative Action Institution

APPENDIX D
TEACHER SCRIPTS FOR ADMINISTERING WRITING CONDITIONS

Story Starter One: Copy Condition

Please check off each step after completing it.

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- Introduce the writing task in the following way:
Today we are going to write a story about a squirrel named Sam, but I'm going to do something a little special. First you are going to copy the beginning of the story and then you get to finish it any way you want as long as it goes with the beginning. Once everyone is done copying, I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't try to erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you will put a circle around the word you're on and then finish your story.
- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.

☐ Step 3: Administer the story starter

- Put the story starter on the overhead projector with all but the first line covered up by a piece of paper. Ask the class to copy the story starter. Once most of the class has copied it, move the sheet down to expose the next line. Keep moving the sheet until the whole story starter is exposed and the class has finished copying. This will keep the class together.

Turn the page for further instructions

- It is important that the students all finish copying at about the same time and don't sit for a long time before they write. If all but 2 or 3 have finished, tell those students to stop right where they are and finish the story from where they stopped.
- Turn off the projector.

Step 4: Write the story

- When the class has finished copying the starter, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.

Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter One: Dictate Condition

Please check off each step after completing it.



Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.



Step 2: Introduce writing

- Introduce the writing task in the following way:
Today we are going to write a story about a squirrel named Sam, but I'm going to do something a little special. First I'm going to tell you the beginning of the story for you to write down and then you get to finish it any way you want as long as it goes with the part I tell you. Once you are done writing down the beginning, I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you're on and then finish your story.
- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.



Step 3: Administer the story starter

- Read all of the following prompt to the class:
Sam Squirrel had a mouth full of nuts. "What should I do?" he asked his
- Go back to the beginning and dictate each word one at a time and have the students write it down. Tell them to sound out the words as best they can if they have trouble spelling anything.
- Repeat the story starter as often as necessary for the class to write the whole thing down.

☐ Step 4: Write the story

- When the class has finished writing the starter from dictation, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep them together in a safe place until you can do the next step. Praise the students for their effort.

☐ Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter One

Sam Squirrel had a mouth full of nuts. "What should I do?" he asked his

Story Starter One: Discuss and Copy Condition

Please check off each step after completing it.



Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.



Step 2: Introduce writing

- Introduce the writing task in the following way:
Today we are going to write a story about a squirrel named Sam, but I'm going to do something a little special. First we are going to talk about squirrels, you are going to copy the beginning of the story and then you get to finish it any way you want as long as it goes with the beginning. Once everyone is done copying, I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you're on and then finish your story.
- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.



Step 3: Administer the story starter

- Discuss the story with the students by asking the following questions and asking for student input to each one: *Today we are going to write a story about a squirrel who is getting ready for winter. What do squirrels do to get ready for winter? Why do they need to do that? What kinds of problems could squirrels have? What would be some solutions?*
- Do not write any of the student ideas down or display any of their ideas. The entire discussion should take about 5 minutes.

- Put the story starter on the overhead projector with all but the first line covered up by a piece of paper. Ask the class to copy the story starter. Once most of the class has copied it, move the sheet down to expose the next line. Keep moving the sheet until the whole story starter is exposed and the class has finished copying. This will keep the class together. It is important that the students all finish copying at about the same time and don't sit for a long time before they write. If all but 2 or 3 have finished, tell those students to finish the story right where they stopped.
- Turn off the projector

☐ Step 4: Write the story

- When the class has finished copying the starter, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep them in a safe place until you can do the last step. Praise the students for their effort.

☐ Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.

Put the stories in the envelope along with these directions. Thank you!

Story Starter One: Discuss and Dictate Condition

Please check off each step after completing it.



Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.



Step 2: Introduce writing

- Introduce the writing task in the following way:

Today we are going to write a story about a squirrel named Sam, but I'm going to do something a little special. First we are going to talk about squirrels, I'm going to tell you the beginning of the story for you to write down, and then you get to finish it any way you want as long as it goes with the beginning. Once everyone is done writing, I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you're on and then finish your story.

- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.



Step 3: Administer the story starter

- Discuss the story with the students by using the following questions and asking for student input to each one: *Today we are going to write a story about a squirrel who is getting ready for winter. What do squirrels do to get ready for winter? Why do they need to do that? What kinds of problems could squirrels have? What would be some solutions?*
- Do not write any of the student ideas down or display any of their ideas. The entire discussion should take about 5 minutes.

- Read all of the following prompt to the class:
Sam Squirrel had a mouth full of nuts. "What should I do?" he asked his
- Go back to the beginning and dictate each word one at a time and have the students write it down. Tell them to sound out the words as best they can if they have trouble spelling anything.
- Repeat the story starter as often as necessary for the class to write the whole thing down.



Step 4: Write the story

- When the class has finished writing the starter from dictation, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "*ready, begin*" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep them together in a safe place until you can do the last step. Praise the students for their effort.



Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter One: Discuss Condition

Please check off each step after completing it.



Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.



Step 2: Introduce writing

- Introduce the writing task in the following way:
Today we are going to write a story about a squirrel named Sam, but I'm going to do something a little special. First we are going to talk about squirrels and then I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you're on and then finish your story.
- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.



Step 3: Administer the story starter

- Discuss the story with the students by using the following questions and asking for student input to each one: *Today we are going to write a story about a squirrel who is getting ready for winter. What do squirrels do to get ready for winter? Why do they need to do that? What kinds of problems could squirrels have? What would be some solutions?*
- Do not write any of the student ideas down or display any of their ideas. The entire discussion should take about 5 minutes.

Turn the page for further instructions

☐ Step 4: Write the story

- When the class has finished talking about squirrels, remind them to write the whole time, to cross out any mistakes and not erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep them in a safe place until you can do the last step. Praise the students for their effort.

☐ Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter One: Topic Condition

Please check off each step after completing it.

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- Introduce the writing task in the following way:

Today we are going to write a story about a squirrel named Sam, but I'm going to do something a little special. I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you're on and then finish your story.

- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.

☐ Step 3: No story starter

☐ Step 4: Write the story

- Tell the students they are going to write a story about a squirrel named Sam who is getting ready for winter.
- Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.

Please turn the page for more instructions.

- When the class is ready to write, say “*ready, begin*” and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt “What more could you write about _____.”
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven’t already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep them together in a safe place until you can do the last step. Praise the students for their effort.

Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student’s name on the form. There should be no identifying information on the page except the student’s identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter Two: Copy Condition

Please check off each step after completing it.

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the condition they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.

- Introduce the writing task in the following way:

Today we are going to write a story about a girl named Kim, but I'm going to do something a little special. First you are going to copy the beginning of the story and then you get to finish it any way you want as long as it goes with the beginning. Once everyone is done copying, I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you're on and then finish your story.

- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.

☐ Step 3: Administer the story starter

- Put the story starter on the overhead projector with all but the first line covered up by a piece of paper. Ask the class to copy the story starter. Once most of the class has copied it, move the sheet down to expose the next line. Keep moving the sheet until the whole story starter is exposed and the class has finished copying. This will keep the class together.

- It is important that the students all finish copying at about the same time and don't sit for a long time before they write. If all but 2 or 3 have finished, tell those students to stop right where they are and finish the story from where they stopped.
- Turn off the projector.

Step 4: Write the story

- When the class has finished copying the starter, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.

Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter Two

Kim knew she could win the race, but just as the whistle blew, she felt

Story Starter Two: Dictate Condition

Please check off each step after completing it.



Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.



Step 2: Introduce writing

- You can refer to the condition they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.

- Introduce the writing task in the following way:

Today we are going to write a story about a girl named Kim, but I'm going to do something a little special. First I'm going to tell you the beginning of the story for you to write down and then you get to finish it any way you want as long as it goes with the part I tell you. Once you are done writing down the beginning, I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you're on and then finish your story.

- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.



Step 3: Administer the story starter

- Read all of the following prompt to the class:
Kim knew she could win the race, but just as the whistle blew, she felt

Turn the page for further instructions

- Go back to the beginning and dictate each word one at a time and have the students write it down. Tell them to sound out the words as best they can if they have trouble spelling anything.
- Repeat the story starter as often as necessary for the class to write the whole thing down.

☐ Step 4: Write the story

- When the class has finished writing the starter from dictation, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.

☐ Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter Two

Kim knew she could win the race, but just as the whistle blew, she felt

Story Starter Two: Discuss and Copy Condition

Please check off each step after completing it.

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the condition they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.

- Introduce the writing task in the following way:

Today we are going to write a story about a girl named Kim, but I'm going to do something a little special. First we are going to talk about the story, you are going to copy the beginning of the story and then you get to finish it any way you want as long as it goes with the beginning. Once everyone is done copying, I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you're on and then finish your story.

- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.

☐ Step 3: Administer the story starter

- Discuss the story with the students by asking the following questions and asking for student input to each one: *Today we are going to write a story about a girl who is going to be in a race. Have you ever been in a race? Did you want to win? How did you feel? (scared, nervous, excited, etc.)*

- Do not write any of the student ideas down or display any of their ideas. The entire discussion should take about 5 minutes.
- Put the story starter on the overhead projector with all but the first line covered up by a piece of paper. Ask the class to copy the story starter. Once most of the class has copied it, move the sheet down to expose the next line. Keep moving the sheet until the whole story starter is exposed and the class has finished copying. This will keep the class together. It is important that the students all finish copying at about the same time and don't sit for a long time before they write. If all but 2 or 3 have finished, tell those students to stop right where they are and finish the story from where they stopped.
- Turn off the projector

☐ Step 4: Write the story

- When the class has finished copying the starter, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.

☐ Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.

Story Starter Two: Discuss and Dictate Condition

Please check off each step after completing it.

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the condition they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time

- Introduce the writing task in the following way:

Today we are going to write a story about a girl named Kim, but I'm going to do something a little special. First we are going to talk about the story, I'm going to tell you the beginning of the story for you to write down, and then you get to finish it any way you want as long as it goes with the beginning. Once everyone is done writing, I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you're on and then finish your story.

- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.

☐ Step 3: Administer the story starter

- Discuss the story with the students by using the following questions and asking for student input to each one: *Today we are going to write a story about a girl who is going to be in a race. Have you ever been in a race? Did you want to win? How did you feel? (scared, nervous, excited, etc.)* Do not write any of the student ideas

down or display any of their ideas. The entire discussion should take about 5 minutes.

- Read all of the following prompt to the class:
Kim knew she could win the race, but just as the whistle blew, she felt
- Go back to the beginning and dictate each word one at a time and have the students write it down. Tell them to sound out the words as best they can if they have trouble spelling anything.
- Repeat the story starter as often as necessary for the class to write the whole thing down.

☐ Step 4: Write the story

- When the class has finished writing the starter from dictation, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.

☐ Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.

Story Starter Two: Discuss Condition

Please check off each step after completing it.

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the condition they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.

- Introduce the writing task in the following way:

First we are going to talk about the story and then I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you're on and then finish your story.

- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.

☐ Step 3: Administer the story starter

- Discuss the story with the students by using the following questions and asking for student input to each one: ***Today we are going to write a story about a girl who is going to be in a race. Have you ever been in a race? Did you want to win? How did you feel? (scared, nervous, excited, etc.)*** Do not write any of the student ideas down or display any of their ideas. The entire discussion should take about 5 minutes.

Turn the page for further instructions

☐ Step 4: Write the story

- When the class has finished talking about being in a race, remind them to write the whole time, to cross out any mistakes and not erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.

☐ Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter Two: Topic Condition

Please check off each step after completing it.



Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.



Step 2: Introduce writing

- You can refer to the condition they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.

- Introduce the writing task in the following way:

Today we are going to write a story about a girl named Kim, but I'm going to do something a little special. I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you're on and then finish your story.

- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.



Step 3: No story starter



Step 4: Write the story

- Tell the students they are going to write a story about a girl named Kim who is in a race at school.
- Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.

- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt “What more could you write about _____.”
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven’t already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.



Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student’s name on the form. There should be no identifying information on the page except the student’s identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter Three: Copy Condition

Please check off each step after completing it.



Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.



Step 2: Introduce writing

- You can refer to the condition they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.

- Introduce the writing task in the following way:

Today we are going to write a story about a boy named Dan, but I'm going to do something a little special. First you are going to copy the beginning of the story and then you get to finish it any way you want as long as it goes with the beginning. Once everyone is done copying, I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't try to erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you will put a circle around the word you're on and then finish your story.

- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.



Step 3: Administer the story starter

- Put the story starter on the overhead projector with all but the first line covered up by a piece of paper. Ask the class to copy the story starter. Once most of the class has copied it, move the sheet down to expose the next line. Keep moving the sheet until the whole story starter is exposed and the class has finished copying. This will keep the class together.

- It is important that the students all finish copying at about the same time and don't sit for a long time before they write. If all but 2 or 3 have finished, tell those students to stop right where they are and finish the story from where they stopped.
- Turn off the projector.

Step 4: Write the story

- When the class has finished copying the starter, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.

Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter Three

Dan was so happy he was at Disney World. He had always wanted to meet

Story Starter Three: Dictate Condition

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the condition they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.

- Introduce the writing task in the following way:

Today we are going to write a story about a boy named Dan, but I'm going to do something a little special. First I'm going to tell you the beginning of the story for you to write down and then you get to finish it any way you want as long as it goes with the part I tell you. Once you are done writing down the beginning, I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you're on and then finish your story.

- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.

☐ Step 3: Administer the story starter

- Read all of the following prompt to the class:

Dan was so happy he was at Disney World. He had always wanted to meet

- Go back to the beginning and dictate each word one at a time and have the students write it down. Tell them to sound out the words as best they can if they have trouble spelling anything.

- Repeat the story starter as often as necessary for the class to write the whole thing down.



Step 4: Write the story

- When the class has finished writing the starter from dictation, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.



Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter Three

Dan was so happy he was at Disney World. He had always wanted to meet

Story Starter Three: Discuss and Copy Condition

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the condition they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.

- Introduce the writing task in the following way:

Today we are going to write a story about a boy named Dan, but I'm going to do something a little special. First we are going to talk about going to DisneyWorld, you are going to copy the beginning of the story and then you get to finish it any way you want as long as it goes with the beginning. Once everyone is done copying, I'm going to time you and see just how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and write the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you will put a circle around the word you are on and then finish your story.

- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.

☐ Step 3: Administer the story starter

- Discuss the story with the students by asking the following questions and asking for student input to each one: *Today we are going to write a story about a boy who is going to Disney World. Have you ever been to Disney World? How did you feel when you went (or if you went if you have those who haven't been)? Who would you like to see at Disney World? How would you find him (or her)?*

- Do not write any of the student ideas down or display any of their ideas. The entire discussion should take about 5 minutes.
- Put the story starter on the overhead projector with all but the first line covered up by a piece of paper. Ask the class to copy the story starter. Once most of the class has copied it, move the sheet down to expose the next line. Keep moving the sheet until the whole story starter is exposed and the class has finished copying. This will keep the class together. It is important that the students all finish copying at about the same time and don't sit for a long time before they write. If all but 2 or 3 have finished, tell those students to finish the story right where they stopped.
- Turn off the projector

☐ Step 4: Write the story

- When the class has finished copying the starter, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.

☐ Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.

Story Starter Three: Discuss and Dictate Condition

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the condition they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.

- Introduce writing in the following way:

Today we are going to write a story about a boy named Dan, but I'm going to do something a little special. First we are going to talk about going to DisneyWorld, I'm going to tell you the beginning of the story for you to write down, and then you get to finish it any way you want as long as it goes with the beginning. Once everyone is done writing, I'm going to time you and see just how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't try to erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you are on and then finish your story.

- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.

☐ Step 3: Administer the story starter

- Discuss the story with the students by using the following questions and asking for student input to each one: *Today we are going to write a story about a boy who is going to DisneyWorld. Have you ever been to DisneyWorld? How did you feel when you went (or if*

you went if you have those who haven't been)? Who would you like to see at DisneyWorld? How would you find him(or her)?

- Do not write any of the student ideas down or display any of their ideas. The entire discussion should take about 5 minutes.
- Read all of the following prompt to the class:
Dan was so happy he was at Disney World. He had always wanted to meet
- Go back to the beginning and dictate each word one at a time and have the students write it down. Tell them to sound out the words as best they can if they have trouble spelling anything.
- Repeat the story starter as often as necessary for the class to write the whole thing down.



Step 4: Write the story

- When the class has finished writing the starter from dictation, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.



Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.

Story Starter Three: Discuss Condition

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the condition they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.
- Introduce writing in the following way:
Today we are going to write a story about a boy named Dan, but I'm going to do something a little special. First we are going to talk about the story and then I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you're on and then finish your story.
- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.

☐ Step 3: Administer the story starter

- Discuss the story with the students by using the following questions and asking for student input to each one: *Today we are going to write a story about a boy who is going to Disney World. Have you ever been to Disney World? How did you feel when you went (or if you went if you have those who haven't been)? Who would you like to see at Disney World? How would you find him(or her)?* Do not write any of the student ideas down or display any of their ideas. The entire discussion should take about 5 minutes.

☐ Step 4: Write the story

- When the class has finished talking about going to DisneyWorld, remind them to write the whole time, to cross out any mistakes and not erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.

☐ Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter Three: Topic Condition

☐ Step 1: Prewriting

- Put the labels for this condition and occasion on the writing papers and hand out to the students, making sure to match the correct identification number with the right student.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the condition they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.

- Introduce writing in this way:

Today we are going to write a story about a boy named Dan, but I'm going to do something a little special. I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't try to erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you're on and then finish your story.

- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.

☐ Step 3: No story starter

☐ Step 4: Write the story

- Tell the students they are going to write a story about a boy named Dan who is going to DisneyWorld and see Mickey Mouse.
- Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.

- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt “What more could you write about _____.”
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven’t already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.



Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student’s name on the form. There should be no identifying information on the page except the student’s identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter Four: Copy Condition

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the conditions they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.
- Introduce the writing task in the following way:
Today we are going to write a story about a momma duck and her family, but I'm going to do something a little special. First you are going to copy the beginning of the story and then you get to finish it any way you want as long as it goes with the beginning. Once everyone is done copying, I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't try to erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you will put a circle around the word you're on and then finish your story.
- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.

☐ Step 3: Administer the story starter

- Put the story starter on the overhead projector with all but the first line covered up by a piece of paper. Ask the class to copy the story starter. Once most of the class has copied it, move the sheet down to expose the next line. Keep moving the sheet until the whole story starter is exposed and the class has finished copying. This will keep the class together.

- It is important that the students all finish copying at about the same time and don't sit for a long time before they write. If all but 2 or 3 have finished, tell those students to stop right where they are and finish the story from where they stopped.
- Turn off the projector.

☐ Step 4: Write the story

- When the class has finished copying the starter, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.

☐ Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter Four

Momma duck and her babies were swimming along when they heard a big noise that

Story Starter Four: Dictate Condition

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the conditions they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.

- Introduce the writing task in the following way:

Today we are going to write a story about a momma duck and her family, but I'm going to do something a little special. First I'm going to tell you the beginning of the story for you to write down and then you get to finish it any way you want as long as it goes with the part I tell you. Once you are done writing down the beginning, I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you're on and then finish your story.

- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.

☐ Step 3: Administer the story starter

- Read all of the following prompt to the class:
Momma duck and her babies were swimming along when they heard a big noise that
- Go back to the beginning and dictate each word one at a time and have the students write it down. Tell them to sound out the words as best they can if they have trouble spelling anything.

- Repeat the story starter as often as necessary for the class to write the whole thing down.

☐ Step 4: Write the story

- When the class has finished writing the starter from dictation, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "*ready, begin*" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.

☐ Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter Four

Momma duck and her babies were swimming along when they heard a big noise that

Story Starter Four: Discuss and Copy Condition

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the conditions they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.
- Introduce the writing task in the following way:
Today we are going to write a story about a momma duck and her family, but I'm going to do something a little special. First we are going to talk about duck families, you are going to copy the beginning of the story and then you get to finish it any way you want as long as it goes with the beginning. Once everyone is done copying, I'm going to time you and see just how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and write the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you will put a circle around the word you are on and then finish your story.
- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.

☐ Step 3: Administer the story starter

- Discuss the story with the students by asking the following questions and asking for student input to each one: *Today we are going to write a story about a momma duck out with her babies. Have you ever seen ducks swimming on a pond? Are there any dangers for a duck family? What do you think they might be? How do you think they stay safe?* Do not write any of the student ideas down or

display any of their ideas. The entire discussion should take about 5 minutes.

- Put the story starter on the overhead projector with all but the first line covered up by a piece of paper. Ask the class to copy the story starter. Once most of the class has copied it, move the sheet down to expose the next line. Keep moving the sheet until the whole story starter is exposed and the class has finished copying. This will keep the class together. It is important that the students all finish copying at about the same time and don't sit for a long time before they write. If all but 2 or 3 have finished, tell those students to stop right where they are and finish the story from where they stopped.
- Turn off the projector



Step 4: Write the story

- When the class has finished copying the starter, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step.



Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.

Story Starter Four: Discuss and Dictate Conditions

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the conditions they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.
- Introduce writing in the following way:
Today we are going to write a story about a momma duck and her family, but I'm going to do something a little special. First we are going to talk about duck families, I'm going to tell you the beginning of the story for you to write down, and then you get to finish it any way you want as long as it goes with the beginning. Once everyone is done writing, I'm going to time you and see just how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't try to erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you are on and then finish your story.
- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.

☐ Step 3: Administer the story starter

- Discuss the story with the students by using the following questions and asking for student input to each one: *Today we are going to write a story about a momma duck out with her babies. Have you ever seen ducks swimming on a pond? Are there any dangers for a*

duck family? What do you think they might be? How do you think they stay safe? Do not write any of the student ideas down or display any of their ideas. The entire discussion should take about 5 minutes.

- Read all of the following prompt to the class:
Momma duck and her babies were swimming along when they heard a big noise that
- Go back to the beginning and dictate each word one at a time and have the students write it down. Tell them to sound out the words as best they can if they have trouble spelling anything.
- Repeat the story starter as often as necessary for the class to write the whole thing down.

☐ Step 4: Write the story

- When the class has finished writing the starter from dictation, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "*ready, begin*" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.

☐ Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.

Story Starter Four: Discuss Condition

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the conditions they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.
- Introduce writing in the following way:
Today we are going to write a story about a momma duck and her family, but I'm going to do something a little special. First we are going to talk about the story and then I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you're on and then finish your story.
- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.

☐ Step 3: Administer the story starter

- Discuss the story with the students by using the following questions and asking for student input to each one: *Today we are going to write a story about a momma duck out with her babies. Have you ever seen ducks swimming on a pond? Are there any dangers for a duck family? What do you think they might be? How do you think they stay safe?* Do not write any of the student ideas down or display any of their ideas. The entire discussion should take about 5 minutes.

Turn the page for further instructions

☐ Step 4: Write the story

- When the class has finished talking about the ducks, remind them to write the whole time, to cross out any mistakes and not erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.

☐ Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter Four: Topic Condition

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the conditions they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.
- Introduce writing in this way:

Today we are going to write a story about a momma duck and her family, but I'm going to do something a little special. I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't try to erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you're on and then finish your story.

- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.

☐ Step 3: No story starter

☐ Step 4: Write the story

- Tell the students they are going to write a story about a momma duck and her family who are swimming in a pond and hear a big noise.
- Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.

- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt “What more could you write about _____.”
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven’t already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.



Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student’s name on the form. There should be no identifying information on the page except the student’s identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter Five: Copy Condition

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the conditions they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.
- Introduce the writing task in the following way:
Today we are going to write a story about a bunny named Buster, but I'm going to do something a little special. First you are going to copy the beginning of the story and then you get to finish it any way you want as long as it goes with the beginning. Once everyone is done copying, I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't try to erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you will put a circle around the word you're on and then finish your story.

☐ Step 3: Administer the story starter

- Put the story starter on the overhead projector with all but the first line covered up by a piece of paper. Ask the class to copy the story starter. Once most of the class has copied it, move the sheet down to expose the next line. Keep moving the sheet until the whole story starter is exposed and the class has finished copying. This will keep the class together.
- It is important that the students all finish copying at about the same time and don't sit for a long time before they write. If all but 2 or 3

have finished, tell those students to stop right where they are and finish the story from where they stopped.

- Turn off the projector.

☐ Step 4: Write the story

- When the class has finished copying the starter, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "*ready, begin*" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.

☐ Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter Five

Buster didn't like being a bunny because he was tired of carrots. One day, he

Story Starter Five: Dictate Condition

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the conditions they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.

- Introduce the writing task in the following way:

Today we are going to write a story about a bunny named Buster, but I'm going to do something a little special. First I'm going to tell you the beginning of the story for you to write down and then you get to finish it any way you want as long as it goes with the part I tell you. Once you are done writing down the beginning, I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you're on and then finish your story.

☐ Step 3: Administer the story starter

- Read all of the following prompt to the class:
Buster didn't like being a bunny because he was tired of carrots. One day, he
- Go back to the beginning and dictate each word one at a time and have the students write it down. Tell them to sound out the words as best they can if they have trouble spelling anything.
- Repeat the story starter as often as necessary for the class to write the whole thing down.

☐ Step 4: Write the story

- When the class has finished writing the starter from dictation, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.

☐ Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter Five

Buster didn't like being a bunny because he was tired of carrots. One day, he

Story Starter Five: Discuss and Copy Condition

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the conditions they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.

- Introduce the writing task in the following way:

Today we are going to write a story about a bunny named Buster, but I'm going to do something a little special. First we are going to talk about bunnies, you are going to copy the beginning of the story and then you get to finish it any way you want as long as it goes with the beginning. Once everyone is done copying, I'm going to time you and see just how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and write the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you will put a circle around the word you are on and then finish your story.

- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.

☐ Step 3: Administer the story starter

- Discuss the story with the students by asking the following questions and asking for student input to each one: *Today we are going to write a story about Buster bunny who doesn't like being a bunny. What do you think he might not like? What do you think he could do instead? What could he try to fix his problem? Do you think it might work?* Do not write any of the student ideas down or display any of their ideas. The entire discussion should take about 5 minutes.

- Put the story starter on the overhead projector with all but the first line covered up by a piece of paper. Ask the class to copy the story starter. Once most of the class has copied it, move the sheet down to expose the next line. Keep moving the sheet until the whole story starter is exposed and the class has finished copying. This will keep the class together. It is important that the students all finish copying at about the same time and don't sit for a long time before they write. If all but 2 or 3 have finished, tell those students to stop right where they are and finish the story from where they stopped.
- Turn off the projector

☐ Step 4: Write the story

- When the class has finished copying the starter, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.

☐ Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.

Story Starter Five: Discuss and Dictate Condition

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

Step 2: Introduce writing

- You can refer to the conditions they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.
- Introduce writing in the following way:

Today we are going to write a story about a bunny named Buster, but I'm going to do something a little special. First we are going to talk about bunnies, I'm going to tell you the beginning of the story for you to write down, and then you get to finish it any way you want as long as it goes with the beginning. Once everyone is done writing, I'm going to time you and see just how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't try to erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you are on and then finish your story.

Step 3: Administer the story starter

- Discuss the story with the students by using the following questions and asking for student input to each one: *Today we are going to write a story about Buster bunny who doesn't like being a bunny. What do you think he might not like? What do you think he could do instead? Do you think it might work?* Do not write any of the student ideas down or display any of their ideas. The entire discussion should take about 5 minutes.
- Read all of the following prompt to the class:
Buster didn't like being a bunny because he was tired of carrots. One day, he

- Go back to the beginning and dictate each word one at a time and have the students write it down. Tell them to sound out the words as best they can if they have trouble spelling anything.
- Repeat the story starter as often as necessary for the class to write the whole thing down.

☐ Step 4: Write the story

- When the class has finished writing the starter from dictation, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "*ready, begin*" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.

☐ Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter Five: Discuss Condition

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the conditions they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.
- Introduce writing in the following way:
Today we are going to write a story about a bunny named Buster, but I'm going to do something a little special. First we are going to talk about bunnies and then I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you're on and then finish your story.

☐ Step 3: Administer the story starter

- Discuss the story with the students by using the following questions and asking for student input to each one: *Today we are going to write a story about Buster bunny who doesn't like being a bunny. What do you think he might not like? What do you think he could do instead? What could he try to fix his problem? Do you think it might work?* Do not write any of the student ideas down or display any of their ideas. The entire discussion should take about 5 minutes.

Turn the page for further instructions

☐ Step 4: Write the story

- When the class has finished talking about Buster, remind them to write the whole time, to cross out any mistakes and not erase them, and to sound out any words they can't spell.

- When the class is ready to write, say “*ready, begin*” and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt “What more could you write about _____.”
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven’t already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.



Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student’s name on the form. There should be no identifying information on the page except the student’s identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter Five: Topic Condition

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the conditions they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.
- Introduce writing in this way:
Today we are going to write a story about a bunny named Buster, but I'm going to do something a little special. I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't try to erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you're on and then finish your story.

☐ Step 3: No story starter

☐ Step 4: Write the story

- Tell the students they are going to write a story about a bunny named Buster who doesn't like being a bunny and does something about it.
- Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.

Turn the page for further instructions

- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt “What more could you write about _____.”
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven’t already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.



Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student’s name on the form. There should be no identifying information on the page except the student’s identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter Six: Copy Condition

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the conditions they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.
- Introduce the writing task in the following way:
Today we are going to write a story about a girl named Jill, but I'm going to do something a little special. First you are going to copy the beginning of the story and then you get to finish it any way you want as long as it goes with the beginning. Once everyone is done copying, I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't try to erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you will put a circle around the word you're on and then finish your story.

☐ Step 3: Administer the story starter

- Put the story starter on the overhead projector with all but the first line covered up by a piece of paper. Ask the class to copy the story starter. Once most of the class has copied it, move the sheet down to expose the next line. Keep moving the sheet until the whole story starter is exposed and the class has finished copying. This will keep the class together.
- It is important that the students all finish copying at about the same time and don't sit for a long time before they write. If all but 2 or 3

have finished, tell those students to stop right where they are and finish the story from where they stopped.

- Turn off the projector.

Step 4: Write the story

- When the class has finished copying the starter, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "*ready, begin*" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.

Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter Six

Jill won a million dollars! She knew just what to do with it. First, she

Story Starter Six: Dictate Condition

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the conditions they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.
- Introduce the writing task in the following way:

Today we are going to write a story about a girl named Jill, but I'm going to do something a little special. First I'm going to tell you the beginning of the story for you to write down and then you get to finish it any way you want as long as it goes with the part I tell you. Once you are done writing down the beginning, I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you're on and then finish your story.

☐ Step 3: Administer the story starter

- Read all of the following prompt to the class:
Jill won a million dollars! She knew just what to do with it. First, she
- Go back to the beginning and dictate each word one at a time and have the students write it down. Tell them to sound out the words as best they can if they have trouble spelling anything.
- Repeat the story starter as often as necessary for the class to write the whole thing down.

☐ Step 4: Write the story

- When the class has finished writing the starter from dictation, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.

☐ Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter Six

Jill won a million dollars! She knew just what to do with it. First, she

Story Starter Six: Discuss and Copy Condition

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the conditions they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.

- Introduce the writing task in the following way:

Today we are going to write a story about a girl named Jill, but I'm going to do something a little special. First we are going to talk about her, you are going to copy the beginning of the story and then you get to finish it any way you want as long as it goes with the beginning. Once everyone is done copying, I'm going to time you and see just how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and write the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you will put a circle around the word you are on and then finish your story.

- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.

☐ Step 3: Administer the story starter

- Discuss the story with the students by asking the following questions and asking for student input to each one: *Today we are going to write a story about a girl named Jill who won a million dollars. How much is a million dollars? What could you do with a million dollars? How would you feel if you won? What problems could Jill run into?* Do not write any of the student ideas down or display any of their ideas. The entire discussion should take about 5 minutes.

- Put the story starter on the overhead projector with all but the first line covered up by a piece of paper. Ask the class to copy the story starter. Once most of the class has copied it, move the sheet down to expose the next line. Keep moving the sheet until the whole story starter is exposed and the class has finished copying. This will keep the class together. It is important that the students all finish copying at about the same time and don't sit for a long time before they write. If all but 2 or 3 have finished, tell those students to stop right where they are and finish the story from where they stopped.
- Turn off the projector

☐ Step 4: Write the story

- When the class has finished copying the starter, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.

☐ Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.

Story Starter Six: Discuss and Dictate Condition

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

□ Step 2: Introduce writing

- You can refer to the conditions they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.
- Introduce writing in the following way:

Today we are going to write a story about a girl named Jill, but I'm going to do something a little special. First we are going to talk about her, I'm going to tell you the beginning of the story for you to write down, and then you get to finish it any way you want as long as it goes with the beginning. Once everyone is done writing, I'm going to time you and see just how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't try to erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you are on and then finish your story.

□ Step 3: Administer the story starter

- Discuss the story with the students by using the following questions and asking for student input to each one: *Today we are going to write a story about a girl named Jill who won a million dollars. How much is a million dollars? What could you do with a million dollars? How would you feel if you won? What problems could Jill run into?* Do not write any of the student ideas down or display any of their ideas. The entire discussion should take about 5 minutes.
- Read all of the following prompt to the class:

Jill won a million dollars! She knew just what to do with it. First, she

- Go back to the beginning and dictate each word one at a time and have the students write it down. Tell them to sound out the words as best they can if they have trouble spelling anything.
- Repeat the story starter as often as necessary for the class to write the whole thing down.

☐ Step 4: Write the story

- When the class has finished writing the starter from dictation, ask them to read it to themselves. Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.

☐ Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter Six: Discuss Condition



Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.



Step 2: Introduce writing

- You can refer to the conditions they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.
- Introduce writing in the following way:
Today we are going to write a story about a girl named Jill, but I'm going to do something a little special. First we are going to talk about her and then I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you're on and then finish your story.
- Demonstrate putting a circle around a word and crossing out a word on the board if you think the class needs it.



Step 3: Administer the story starter

- Discuss the story with the students by using the following questions and asking for student input to each one: *Today we are going to write a story about a girl named Jill who won a million dollars. How much is a million dollars? What could you do with a million dollars? How would you feel if you won? What problems could Jill run into?* Do not write any of the student ideas down or display any of their ideas. The entire discussion should take about 5 minutes.

Turn the page for further instructions

☐ Step 4: Write the story

- When the class has finished talking about winning a million dollars, remind them to write the whole time, to cross out any mistakes and not erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.
- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt "What more could you write about _____."
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven't already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.

☐ Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.
- Put the stories in the envelope along with these directions. Thank you!

Story Starter Six: Topic Condition

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce writing

- You can refer to the conditions they've already done and say that they are going to that story writing activity where you time their writing again, but you are going to present the story starter in a slightly different way this time.
- Introduce writing in this way:
Today we are going to write a story about a girl named Jill, but I'm going to do something a little special. I'm going to time you and see how long it takes you to write your stories so I can see just what good writers you are. When you are writing today, it is important that you stay focused and keep writing the whole time. Don't stop until I tell you to. Also, if you get to a word that you don't know how to spell, sound it out and do your best. I'm not going to help you with the spelling today. If you make a mistake, cross out the word you don't want and keep writing. Don't try to erase your mistake because it will take too long. When the beeper goes off, I want you to circle the word you are writing, and then when I say go again, keep writing. When it goes off again, you need to put a circle around the word you're on and then finish your story.

☐ Step 3: No story starter

☐ Step 4: Write the story

- Tell the students they are going to write a story about a girl named Jill who wins a million dollars but someone doesn't want her to.
- Remind them to write the whole time, to cross out any mistakes and not try to erase them, and to sound out any words they can't spell.
- When the class is ready to write, say "**ready, begin**" and start the timer for 3 minutes.
- After 3 minutes, ask the students to circle the word they are writing. Monitor that they have done so.

Turn the page for further instructions

- Start the timer again for 3 minutes, telling the class to all start again at the same time.
- If students stop writing before the time is up, prompt them to continue using only the following prompt “What more could you write about _____.”
- At the end of the second 3 minutes, ask them to put a circle around the word they are on and give them time to finish their story if they haven’t already. Monitor that they have put a circle.
- Once the students are done, collect the stories and keep together in a safe place until you can do the next step. Praise the students for their effort.



Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student’s name on the form. There should be no identifying information on the page except the student’s identification number.
- Put the stories in the envelope along with these directions. Thank you!

APPENDIX E
TEACHER SCRIPTS FOR HANDWRITING FLUENCY
AND SPELLING ACHIEVEMENT MEASURES

Handwriting Fluency

Please check off each step after completing it.

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce the activity

- Use the following words to introduce the handwriting test:
We're going to play a game that will show me how well and quickly you can write. This will help me know what to teach you in writing. First, I am going to time you for 60 seconds while you write the lowercase (little) letters of the alphabet as fast and as carefully as you can. Then I'm going to ask you to copy a sentence as fast and carefully as you can. Don't try and erase any of your mistakes, just cross them out and go on.

☐ Step 3: Administer the alphabet task

- Have the students turn their paper to the side with just lines. Make sure they have the paper on the right side and a pencil without an eraser.
- Instruct them to follow these directions:
When I say "ready, begin," you are going to write the little letters of the alphabet as fast and as carefully as you can. I'm going to time you for 60 seconds, and you need to write the whole time until I say stop. If you make a mistake, draw a line through the letter and keep going. When you hear the timer go off, stop and put your pencil down.
- Demonstrate making a mistake and crossing a line through it on the board if you think your class needs it.
- Set your timer for 60 seconds, make sure the students are ready, and say **ready, begin**.
- When the timer goes off, tell the students to stop and put down their pencils.

☐ Step 4: Administer the sentence copying task

- Instruct the students to turn the paper over to the side with a sentence. They are going to repeat the same activity except they are to copy the sentence instead.

- Use the following directions:

We are going to do another timing. This time, I want you to copy this sentence, The fox jumps over the lazy dog, as many times as you can in a minute while writing as fast and carefully as you can. I'm going to time you for 60 seconds again, and it's important that you write the whole time until I say stop. If you get to the end of the sentence, start over again. If you make a mistake, draw a line through the letter and keep going. When you hear the timer go off, stop and put your pencil down.

- Demonstrate making a mistake and crossing a line through it on the board if you think your class needs it.
- Set your timer for 60 seconds, make sure the students are ready, and say **ready, begin**.
- When the timer goes off, tell the students to stop and put down their pencils. Praise them for their effort and collect the sheets. Please keep them together in a safe place until you can do the next step.

☐ Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.
- Put the papers in the envelope. Thank you!

Spelling Achievement Test

Please check off each step after completing it.

☐ Step 1: Prewriting

- Hand out the provided paper to the students. Ask them to put their first name in small letters in the upper right-hand corner.
- Make sure everyone has a pencil without an eraser.

☐ Step 2: Introduce the activity

- Use the following words to introduce the spelling test:
I'm going to say some words that I want you to spell for me so I can see all the things you've learned this year about spelling. Some of words will be easy to spell and some will be hard. When you don't know how to spell a word, just do the best you can. Each time I will say the word, then use it in a sentence, and then I will say the word again.

☐ Step 3: Administer the spelling test

- Make sure the students have the paper turned to the side beginning with number 1 and have a pencil.
- Administer the following list of words like a spelling test: dictate the word, say the sentence, and then dictate the word again. Do not segment or stretch the word for the students. The test is set up in groups of five words with a total of 20 words.
- Circulate through the students and monitor the correctness of their responses. Stop administering the test when all of the class has missed 4 or more words in a set of five.
- The spelling list:

- | | | |
|----------|-----------------------------------|-------|
| 1. hen | The hen sat on her eggs. | hen |
| 2. wish | The boy made a wish. | wish |
| 3. trap | A spider web is a trap for flies. | trap |
| 4. jump | A kangaroo can jump high. | jump |
| 5. brave | A brave dog scared the robbers. | brave |
| 6. smile | A smile shows that you're happy. | smile |

7. grain	One kind of grain is called wheat	grain
8. crawl	The baby can crawl but not walk.	crawl
9. clerk	The clerk sold some shoes to me.	clerk
10. clutch	The clutch in the car needed fixing.	clutch
11. palace	The queen lived in a palace.	palace
12. observe	I like to observe birds.	observe
13. shuffle	Please shuffle the cards before you deal.	shuffle
14. exciting	The story I'm reading is exciting.	exciting
15. treason	The man was found guilty of treason.	treason
16. column	His picture was in the first column of the newspaper.	column
17. variety	A grocery store has a variety of foods.	variety
18. extension	The workers need an extension ladder to reach the roof.	extension
19. competition	There was much competition between the businesses.	competition
20. illiterate	An illiterate person cannot read.	illiterate

Stop when the class has spelled 0 or 1 word correctly out of any set of 5.

- Collect the spelling tests and keep them together in a safe place until you can do the next step. Praise the students for their effort.



Step 5: After writing

- Take the provided labels and place the labels with the correct identification number over the student's name on the form. There should be no identifying information on the page except the student's identification number.
- Put the papers in the envelope.

Thank you!

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BIOGRAPHICAL SKETCH

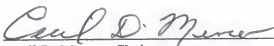
Roxanne Hudson was born in Portland, Oregon, on January 18, 1967. She graduated from Bellingham High School in 1985 and then attended Gonzaga University where she received a Bachelor of Arts, Honors degree in Political Science. She received a Master of Education degree and teaching certificate in Exceptional Children from Western Washington University in Bellingham in 1994.

After earning her undergraduate degree, Roxanne served in the U.S. Peace Corps as a deaf education volunteer in the Philippines. After this, she worked as a teacher's assistant in residential schools for boys with emotional and behavioral disabilities in New Hampshire and Washington. After receiving her teaching certificate, she taught elementary students with disabilities in resource and self-contained programs in Washington and Florida. While completing her doctoral studies at the University of Florida, Roxanne worked as a graduate teaching and research assistant in the Department of Special Education.

Roxanne has presented at numerous state, national, and international conferences. Her conference presentations have focused on effective reading instruction, teacher education, and multicultural education. She has also provided inservice teacher education workshops in Florida and Guatemala on early literacy development, cooperative learning, and effective teaching methods.

In the future, Roxanne plans to pursue research examining connections between reading and writing instruction in young children and the prevention of reading and writing disabilities. She hopes to pursue a career teaching and researching at the university level.

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